Yukon State of the Environment Report 2005

Yukon
Environment

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SOE 2005 Acknowledgements

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Introduction

The State of the Environment Report is a requirement of the Yukon's *Environment Act*. The *Environment Act* requires a State of the Environment Report to be completed once every three years along with interim reports in intervening years. The report's purpose is to track potential environmental issues using a series of standard indicators. Compiling the information in the report also allows the Yukon public to monitor progress toward the achievement of the objectives of the *Environment Act*. It also provides baseline information for environmental planning, assessment and regulation.

The report tracks indicators in several different areas including air, land, water, and climate change. Indicators are key measurements that can be used to monitor change. Comparing these indicators on a regular basis over time will give us a picture of how each aspect of the environment in question is doing. Indicators for this report are determined based on data availability, reliability, and how easily they can be interpreted. Information to track the indicators is collected from all orders of government.

YUKON STATE OF THE ENVIRONMENT REPORT

47. (1) The government of Yukon shall report publicly on the state of the environment pursuant to this Act.

(2) The purpose of this report under subsection (1) is:

(a) to provide early warning and analysis of potential problems for the environment;

(b) to allow the public to monitor the progress toward the achievement of the objectives of this Act*; and*

(c) to provide baseline information for environmental planning, assessment and regulation.

Report Highlights

1. Air

The summer of 2005 included some forest fire activity. Air quality monitoring reflected these increased emissions. Overall, Yukon residents continue to enjoy high outdoor air quality.

2. Climate Change

It is hoped that reducing our greenhouse gas emissions will reduce the speed at which our climate changes. Yukoners undertook various activities in the 2003–2005 period towards reducing our emissions. Overall, Yukon has seen a reduction in our greenhouse gas emissions by 26% since 1990. This is primarily due to the closing of major mines, with a corresponding reduction in the use of diesel generators to help power industrial activity.

3. Water

On April 1, 2003, the Yukon government assumed responsibility from the federal government for regulating and monitoring water use. Since then, the two levels of government have worked cooperatively to establish water quality monitoring stations at three locations in the Yukon. Data from these locations indicates excellent water quality.

4. Land

Effective planning that considers both current and future human activities, balanced with environmental protection, is essential to sustainable land development. Plans related to land use, resources and protected areas have been slowly developing throughout the Yukon. Planning as a means of addressing the need for information (land use planning, fish and wildlife planning, special management area planning) has begun to increase.

Waste disposal is another indicator used to determine the status of land in the Yukon. Again, we are seeing an improvement in the way landfills are designed and operated across the territory. In particular, the City of Whitehorse has been able to increase composting and thereby reducing the amount of debris going into the City's landfill, which will lengthen the usable life of the landfill.

5. Nature

By the end of 2005, the Northern Contaminants Program was focusing on temporal and geographical trends in contaminants distribution. This led to interesting findings regarding contaminants levels in moose and caribou at different times of the year, and between the sexes.

The Yukon government conducted public consultation during 2005 regarding the development of a *Species at Risk Act*. It has also begun to look closely at the management of critical habitats, such as wetlands.

Environmental Indicators

1. Air

1.1 Air Quality

What is the Issue?

Poor air quality affects human health. Nationally, Environment Canada partners with provinces and territories to monitor outdoor air quality to ensure that Canadians can breathe clean air. Pure air contains 21% oxygen and 78% nitrogen by volume. The air that we breathe during the course of an average day also includes traces of other elements. Levels of some air contaminants, such as lead, have decreased nationally over the last 10 years, but others remain problematic.

What are the Indicators?

We measure air quality by monitoring particulate matter (PM), ground level ozone, nitrogen oxides and carbon monoxide levels in the air. Coarse PM (particles with a diameter greater than 2.5 micrometres (μ) and less than 10μ) primarily contains materials derived from the earth's crust, such as soil and mineral dust as well as pollen. Fine particulate matter (particles with a diameter less than 2.5μ, or $PM_{2.5}$) is toxic and is usually produced from human activities, such as fossil fuel combustion, road and construction sites, wood burning stoves or forest fires. $PM_{2.5}$ can be inhaled deeply into the lungs, and may contain sulphate, nitrate, ammonium, metals and hundreds of different organic compounds. The levels of this pollutant provide a good indicator of air quality. Specific indicators are:

Mean Ambient Annual $PM_{2.5}$ levels in the City of Whitehorse (Figure 1.1). The measurements are taken from a station located downtown.

COMMON AIR POLLUTANTS

Carbon monoxide (CO) is a gas produced primarily by the incomplete combustion of carbon-containing fuels from sources such as vehicles, woodstoves and furnaces.

Nitrogen oxides (NOx) are released during combustion of fossil fuels such as gasoline, diesel and heavy fuel oil.

Ground level ozone (O_3) is not emitted directly from human activities. It is generated by a reaction between ultraviolet light from the sun, NOx and volatile organic compounds (VOCs). Ground level ozone is the major component of photochemical smog.

What is Happening?

Figure 1.1. *Mean Ambient Annual $PM_{2.5}$ in Whitehorse 2003–2005*

Year	Mean Ambient Annual $PM_{2.5}$ ($\mu g/m^3$)
2003	3.3
2004	4.8
2005	2.8

Higher values for 2004 reflect significant forest fire activity. Conversely, 2005 was a wetter year so values were lower.

Why is it Happening?

Thanks to limited industrial emissions and a relatively low population density, Whitehorse residents generally enjoy good air quality. When elevated $PM_{2.5}$ levels do occur it is primarily due to wood smoke from woodstoves or forest fires.

FAR REACHING EFFECTS OF YUKON FOREST FIRES

During the warm, dry summer of 2004, the Yukon experienced a significant number of major wildfires that burned an estimated six percent of the Yukon's forests. It was also an active fire year in Alaska. Researchers at the National Centre for Atmospheric Research in Boulder, Colorado looking at the effects of the fires on the atmosphere say the fires raised ozone levels around the northern hemisphere, and produced a record amount of carbon monoxide.

Between June and August 2004, it is estimated that Yukon wildfires added about 30 billion kilograms of carbon monoxide into the atmosphere — about as much as was released by human-related activities in the continental U.S. during the same period, according to the scientist's report.

They also found that ground-level concentrations of ozone increased by 25 per cent or more in parts of the northern continental U.S., and as much as 10 per cent as far away as Europe.

Why is it Significant?

When breathed, fine particulate matter in the air may pose serious risks to human health, especially among the elderly, children and people with chronic respiratory illnesses. It is positive that air quality in the wintertime, while perhaps compromised by smoke from wood burning stoves, has not exceeded the health-based Canada wide standard in the three year period.

Data Quality

The National Air Pollution Surveillance (NAPS) data is quality controlled, assured and standardized by Environment Canada. Environment Yukon operates the station, gathers data and performs initial quality checks. Data from the NAPS station, located in downtown Whitehorse, is not representative of air quality Yukon-wide.

NORTHERN CONTAMINANTS PROGRAM

The Northern Contaminants Program (NCP) was established by the federal government in 1991 in response to concerns about human exposure to elevated levels of contaminants in fish and wildlife species that are important to the traditional diets of northern First Nations people. Early studies indicated that there was a wide spectrum of substances — persistent organic pollutants, heavy metals, and radionuclides — many of which had no Arctic or Canadian sources, but which were, nevertheless, reaching unexpectedly high levels in the Arctic ecosystem.

Under this program, air concentrations of persistent organic pollutants (POPs) have been measured in the Canadian and Russian Arctic since 1992. This is mainly because air is the major transport pathway for these pollutants to enter the Arctic ecosystems. POPs can be transported over great distances and tend to bioaccumulate and biomagnify through food chains which resulted in unusually high exposure of the northern populations who rely on country foods.

Under the Northern Contaminants Program, weekly samples of air are collected at four Canadian and two Russian Arctic sites, including Alert, Nunavut; Tagish, Yukon; Little Fox Lake, Yukon; Kinngait, Nunavut; Dunai Island, Russia and Amderma, Russia. Selected POPs, including polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and organochlorine (OC) pesticides, are analyzed in both the gas and particulate phases.

The project is continuing to gather data and is beginning to be able to identify trends in air pollutant levels. The scientists involved are also beginning to look at developing passive sampling techniques that will allow for easier monitoring in remote locations.

TURNING OFF VEHICLES TO REDUCE AIR POLLUTION AND CLIMATE CHANGE

In 2005, governments in partnership with local community groups launched a new public awareness program to try to curb the practice of idling vehicles in the cold Yukon winter weather. This program replaced the "Clean the Air" educational campaign run by Environment Yukon since 2002.

140 idle-free zone signs emblazoned with the program's mascot "Auntie Idle" were installed at parking lots, drop-off zones and delivery areas around the city, including at City Hall and local government buildings. According to Your Yukon, *the Environment Canada weekly public education column, "An idling engine produces twice as many exhaust emissions as an engine in motion, which means that areas where idling occurs are doubly affected by air pollution. Since cars are usually left to idle in places where people tend to be — near doorways, sidewalks and in front of buildings — excess auto exhaust is finding its way into our lungs whether we like it or not."*

Auntie Idle promotes three main reasons why Yukon drivers should avoid idling: saving money, preventing vehicle wear and tear, and reducing greenhouse gas emissions.

The Yukon government, the Yukon Conservation Society, Raven Recycling, the Energy Solutions Centre, the Yukon Science Institute, the City of Whitehorse and Environment Canada's EcoAction Community Funding Program are involved in the Auntie Idle campaign.

2. Climate Change

2.1 Our Changing Climate

What is the Issue?

The climate of our planet has always been variable. Many of the Yukon's landforms have been created as a direct result of the last ice age that occurred about 10,000 years ago. But there is growing concern about the climate change we are experiencing today. The rapid rate of changes we are experiencing is unprecedented and it appears that much of this change is a direct result of human activities or development.

Our planet is kept warm due to the "greenhouse effect." This means that energy radiated by the earth is trapped by the atmosphere instead of escaping into outer space. Greenhouse gases, (including carbon dioxide, methane, and nitrous oxide) that trap this energy are usually found in the atmosphere at very low concentrations. However, the concentration of these gases is increasing and most scientists believe this is, in part, a result of human activities such as the burning of fossil fuels.

For example, prior to the Industrial Revolution, carbon dioxide (CO_2) concentration in the atmosphere was 280 ± 10 ppm for several thousand years. But, according to Environment Canada, the present atmospheric CO_2 concentration is above 360 ppm. This is the highest level of CO_2 concentration in our atmosphere reached over the past 420,000 years. These high concentrations are trapping more and more of the energy radiated from the earth which, in turn, is increasing global temperatures and changing our climate.

Changes in climate can have a variety of effects, from changes in annual temperatures or intensification of weather patterns. In the North, we are feeling the impacts of climate change with greater intensity than other parts of the globe. Permafrost and polar ice are melting at unprecedented rates. Glaciers are receding. Beetles are infesting our forest. New species of animals and plants are moving into northern areas while some of those native to the area are disappearing.

While many of these changes are occurring as a result of human activities across the globe, Canada — and the Yukon — are doing their parts to reduce the amount of greenhouse gases being released into the environment. In 1997, Canada signed the Kyoto Protocol, an international agreement between over 150 countries to reduce the amount of greenhouse gases that they produce. In Canada's case, it means we have committed to reducing our greenhouse gas emissions to a level 6% below 1990 levels by 2012. It is anticipated that the reduction of greenhouse gases will slow down the climate change impacts we are experiencing.

What are the Indicators?

Primary indicators of climate change include measuring greenhouse gas emissions and monitoring long-term seasonal change in temperatures.

Greenhouse Gas Emissions

Greenhouse gases are emissions that affect the temperature and climate of the earth's surface. The main greenhouse gases emitted due to human activity are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O).

How do we measure greenhouse gases?

Each greenhouse gas (GHG) traps the sun's energy to varying degrees. This is called the chemical's radiative forcing (or global warming potential — GWP). By measuring and describing a greenhouse gas in terms of its global warming potential, its radiative forcing can be converted to a similar unit of carbon dioxide equivalents. The radiative forcing of a gas is dependent on how it reacts with long-wave radiation coming from the Earth, and how long lived it is. Metric Tons (Mt) Carbon Dioxide Equivalents is the product of the weight of gas in metric tons and the GWP. This unit allows for a quick comparison of different gasses relative to the effect they have on the atmosphere (from University of New Hampshire, 1990–2003 Greenhouse Gas Emissions Inventory).

Table 2.1. *Trends in Yukon GHG Emissions*

	1990	**1995**	**2000**	**2003**	**2005**
Total GHG Emissions (kt)	560	570	470	460	420
Change since 1990	n/a	1.8%	-16.1%	-17.9%	-25.0%
Annual Change	n/a	0.4%	-3.8%	-0.7%	-4.4%

Overall, the Yukon has seen a decrease in greenhouse gas emissions since 1990. This is primarily as a result of lower emissions due to mine shutdowns and subsequent reductions in demands for electricity produced by burning fossil fuels. Compared to the rest of Canada, the Yukon only contributes a tiny percentage of overall greenhouse gas emissions. It is estimated that Yukon residents each produce approximately 5.7 tonnes of greenhouse gases annually, which is slightly below the national average (Northern Climate Exchange: Bulletin 5).

In the Yukon, it is difficult to evaluate the relative contributions of sectors due to the cyclical nature and size of some of the Yukon's mining operations. For example, when it was operating, the Faro mine used approximately 40% of the power generated in the Yukon. The mine's operations also significantly increased emissions produced by the transportation sector.

Transportation and Energy

At this time, transportation creates the highest overall percentage of greenhouse gas emissions in the Yukon. This includes emissions from both the transportation industry (mainly freight), as well as personal vehicles. The Yukon's remote location and the large distances between communities means the territory relies heavily on extensive transportation networks to deliver a large proportion of the goods we consume on a regular basis. The combination of our small population and large geographical area means that the opportunities for developing public transportation within and between communities are limited.

The energy industries sector is another major producer of greenhouse gases in the Yukon. This includes emissions produced by power generation and the mining industry and can vary considerably depending on levels of production. Between 1990 and 1999, the Yukon's total CO_2 emissions varied between 436 and 759 kilotonnes per year.

The Yukon relies on a variety of power sources. The Whitehorse-Aishihik-Faro grid is supplied by hydroelectricity from two dams: on the Yukon River at Whitehorse, and at Aishihik Lake. A small portion of the power for this grid is supplied by two wind turbines located on Haeckel Hill. The Mayo dam provides electrical power to Mayo and Dawson. Watson Lake and a few smaller communities (Swift River, Destruction Bay, Burwash Landing, Beaver Creek and Old Crow) rely on diesel generators to supply their power.

Figure 2.1.1. *Yukon Greenhouse Gas Emissions by Sector*

Greenhouse Gas Categories	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL (kt CO^2 eq)	**562**	**569**	**610**	**581**	**508**	**518**	**466**	**457**	**465**	**463**	**435**	**418**
ENERGY	**540**	**543**	**583**	**555**	**481**	**491**	**438**	**429**	**437**	**434**	**406**	**389**
a. Stationary Combustion Sources	**233**	**252**	**268**	**249**	**210**	**216**	**194**	**173**	**171**	**166**	**132**	**126**
Electricity and Heat Generation	95.8	54.6	104	89.1	33.2	26.6	17.4	14.9	17.6	10.9	8.18	7.76
Fossil Fuel Industries	2.8	91	75	80	92	91	84	56	48	28	9.7	28
Mining & Oil and Gas Extraction	4.21	10.5	13.4	4.69	3.36	3.88	1.54	2.12	2.94	2.12	1.73	3.12
Manufacturing Industries	9.73	0.49	0.28	0.61	–	1.73	–	2.54	–	–	–	–
Construction	5.51	4.56	3.59	2.45	1.97	2.34	2.44	1.66	1.61	2.68	1.99	1.27
Commercial & Institutional	84.2	62.3	42.4	40.6	38.3	39.9	54.0	52.1	54.1	59.7	40.5	39.7
Residential	30	20	23	26	33	39	34	29	32	42	56	39
Agriculture & Forestry	1.26	7.84	6.24	6.07	7.76	10.6	0.98	14.4	15.2	20.7	13.7	6.55
b. Transportation[1]	**310**	**290**	**310**	**300**	**270**	**270**	**240**	**250**	**260**	**260**	**270**	**260**
Domestic Aviation	21	21	24	16	22	21	23	16	15	21	22	22
Road Transportation	185	224	218	188	189	195	166	169	173	169	165	161
Light Duty Gasoline Vehicles	81.4	74.6	68.2	64.7	65.2	64.4	50.4	48.6	47.0	46.4	40.3	35.2
Light Duty Gasoline Trucks	31.3	42.9	41.7	44.1	49.2	49.0	40.8	42.6	43.8	45.5	41.5	38.7
Heavy Duty Gasoline Vehicles	10.5	9.99	10.3	8.14	8.10	8.15	6.07	6.47	6.27	6.50	6.01	5.42
Motorcycles	0.47	0.42	0.34	0.27	0.31	0.30	0.33	0.33	0.36	0.39	0.36	0.33
Light Duty Diesel Vehicles	0.57	0.52	0.51	0.47	0.47	0.47	0.36	0.35	0.34	0.35	0.33	0.29
Light Duty Diesel Trucks	0.62	0.98	1.69	2.71	2.98	3.03	2.57	2.61	2.64	2.77	2.60	2.71
Heavy Duty Diesel Vehicles	58.7	90.1	93.2	65.4	61.3	67.7	65.1	67.2	70.7	65.1	71.7	76.8
Propane & Natural Gas Vehicles	1.5	4.0	2.2	1.9	1.8	1.7	0.68	1.0	1.6	1.9	2.1	1.1
Railways	–	–	–	–	–	–	–	–	–	–	–	–
Domestic Marine	–	–	–	–	–	–	–	–	–	–	–	–
Others	100	40	70	100	60	60	50	70	70	70	80	80
Off Road Gasoline	10	8	7	6	20	20	10	10	10	10	3	3
Off Road Diesel	90	40	60	90	40	30	40	60	60	60	80	70
Pipelines	–	–	–	–	–	–	–	–	–	–	–	–
c. Fugitive Sources[2]	**–**	**3.77**	**3.14**	**4.10**	**3.68**	**3.55**	**2.71**	**2.15**	**5.40**	**3.54**	**3.08**	**3.12**
Coal Mining	–	–	–	–	–	–	–	–	X	X	X	X
Oil and Natural Gas	–	3.77	3.14	4.10	3.68	3.55	2.71	2.15	X	X	X	X
INDUSTRIAL PROCESSES[3]	**1.38**	**2.09**	**1.88**	**1.19**	**0.72**	**0.81**	**0.71**	**0.61**	**0.99**	**0.75**	**0.49**	**0.57**
a. Mineral Products	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Cement Production	–	–	–	–	–	–	–	–	–	–	–	–
Lime Production	–	–	–	–	–	–	–	–	–	–	–	–
b. Chemical Industry	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Nitric Acid Production	–	–	–	–	–	–	–	–	–	–	–	–
Adipic Acid Production	–	–	–	–	–	–	–	–	–	–	–	–
c. Metal Production	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Iron and Steel Production	–	–	–	–	–	–	–	–	–	–	–	–
Aluminum Production	–	–	–	–	–	–	–	–	–	–	–	–
SF_6 used in Magnesium Smelters/Casters	–	–	–	–	–	–	–	–	–	–	–	–
d. Consumption of Halocarbons and SF_6	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
e. Other & Undifferentiated Production[4]	**1.4**	**2.1**	**1.9**	**1.2**	**0.72**	**0.81**	**0.71**	**0.61**	**0.99**	**0.75**	**0.48**	**0.57**
SOLVENT & OTHER PRODUCT USE	**0.18**	**0.22**	**0.22**	**0.24**	**0.21**	**0.22**	**0.24**	**0.21**	**0.16**	**0.21**	**0.20**	**0.17**
AGRICULTURE	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
a. Enteric Fermentation	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
b. Manure Management	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
c. Agriculture Soils	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Direct Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
"Pasture, Range and Paddock Manure"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Indirect Sources	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WASTE	**21**	**24**	**24**	**25**	**26**	**26**	**26**	**27**	**27**	**28**	**28**	**29**
a. Solid Waste Disposal on Land	**18**	**21**	**21**	**22**	**22**	**23**	**23**	**24**	**24**	**25**	**25**	**26**
b. Wastewater Handling	**2.9**	**3.2**	**3.0**	**3.3**	**3.2**	**3.0**	**2.9**	**2.8**	**2.8**	**3.0**	**3.1**	**3.1**
c. Waste Incineration	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**

Notes:
[1] Emissions from Fuel Ethanol are reported within the gasoline transportation sub-categories.
[2] Fugitive emissions from refineries and the bitumen industry are only reported at the national level.
[3] Emissions associated with the use of mineral products and consumption of halocarbons & SF_6 are only reported at the national level.
[4] Emissions coming from ammonia production are included in the category Other & Undifferentiated Production at provincial levels.
X Indicates confidential data.
Totals may not add up due to rounding.

Source: Environment Canada

Oil and Gas

Initial processing of natural gas for shipment from the Kotaneelee gas field in southeast Yukon is responsible for approximately 2% of the Yukon's greenhouse gas emissions.

Agriculture and Forestry

Land clearing also contributes to increases of greenhouse gases. Forest disturbances, particularly from forest fires and also from phenomena like the spruce bark beetle infestation, are a larger source of forest greenhouse gas emissions than harvesting of trees in forestry operations. Vegetation absorbs carbon dioxide and the clearing of land and burning of debris creates emissions. However, the CO_2 from the burning of modern organic material is not counted, only the CH_4 and N_2O emissions, which are less than 1% of the CO_2 emissions.

In addition, methane can be released when permafrost starts to thaw as a result of ground disturbance or climate change. On the agriculture side, livestock produce methane and livestock manure also produces gas as it decomposes. However, there is no current research underway to quantify the effects of agriculture on methane release. Further, the agricultural industry is small relative to other industrial activities, so greenhouse gas emissions from this sector are unlikely to be significant.

Commercial and Institutional

Government and small business also contribute to greenhouse gas emissions in the Yukon through the burning of fossil fuels for heating and transportation. Becoming more energy efficient is the main way to reduce overall emissions from this sector. Federal, territorial and First Nations governments are all working to develop strategies to reduce emissions.

Residential

Residential emissions mainly result from the burning of fossil fuels and wood to heat our homes. Becoming more energy efficient, through buying more efficient appliances and lightbulbs, using programmable thermostats, or simply maintaining home furnaces are important steps to reducing overall emissions.

Waste

Methane is produced when organic matter decomposes in our landfills. In some Yukon communities, garbage is still burned to reduce its volume. This releases greenhouse gases and toxic fumes into the atmosphere.

Industrial

Light industrial transportation is the most significant contributor to industrial greenhouse gas emissions for this sector. The Yukon lacks a significant industrial manufacturing sector that would generate additional greenhouse gas emissions.

Fugitive Sources

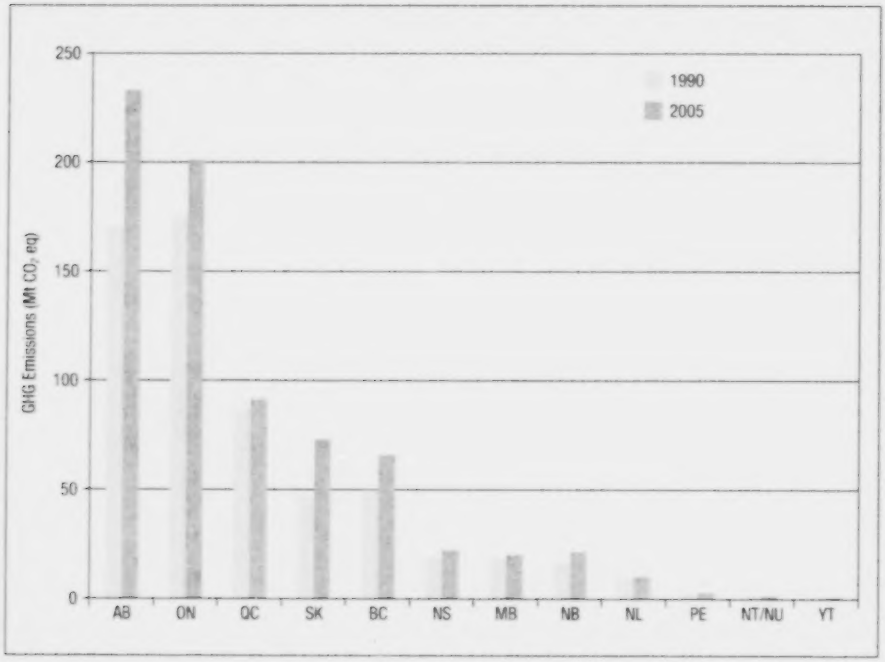
These are intentional and unintentional releases of gas. Fugitive sources include gas released during shipping, processing, and emissions from combustion where the combustion does not support a production activity. An example of this would be natural gas flaring at oil production facilities.

"Approximately 73% of total greenhouse gas emissions nationally in 2005 resulted from the combustion of fossil fuels. Another 9% were from fugitive sources, with the result that almost 82% of emissions were from the energy sector." (Environment Canada National Inventory Report)

Figure 2.1.2. *Canada Greenhouse Gas Emissions by Sector*

Source	%
Energy	81.6
Industrial Processes	7.1
Agriculture	7.6
Waste	3.7

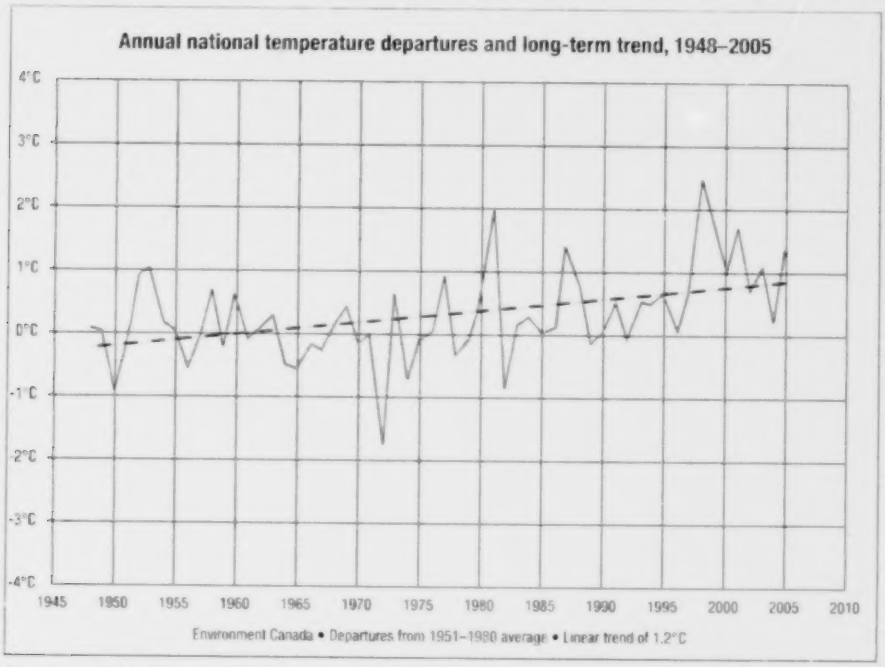
Figure 2.1.3. *Provincial and Territorial Greenhouse Gas Emissions*



Temperature Change

One of the most obvious effects of climate change is how our temperature and weather are changing. On average, the overall temperature of the globe has risen 0.6°C over the past century, with Canada's average temperature rising about 1°C between 1950 and 2000. While there is still no conclusive scientific evidence supporting a link between weather extremes and greenhouse gas-induced climate change, there is little debate that Canada has experienced recent changes in weather patterns and a substantial increase in the number of weather-related disasters.

Figure 2.1.4. *Annual National Temperature Departures and Long-Term Trends, 1948–2005*



(Source: Environment Canada Climate Trends and Variations Bulletin, 2005)

In its 2004 report, the Arctic Climate Impact Assessment projected that the rate and magnitude of temperature change will be greatest in high latitude regions of the northern hemisphere, and may rise by as much as 5 to 7 degrees Celsius. Yukon-specific projections* include the following changes in Yukon climate:

- Higher year-round temperatures — winters warming more than summers, with the winter warming being greater farther north; summers warming more in the south and central Yukon than in the north, due to the moderating effect of the Beaufort Sea.
- More precipitation in the winter, with the change being greater farther north. (There will be little change in average summer precipitation levels.)
- More and larger storms (both winter storms and heavy summer rainfall events, with more thunder and lightning).

Some of these changes have already become evident, but researchers cannot predict exactly when, or if, we will see all of them, or to what extent.

*(*Source: Yukon Climate Exchange: Bulletin 2)*

Figure 2.2.1. *Ten Most Significant Annual Temperature Increases in the Yukon Since 1948*

Year	Temperature Change (°C)
2005	2.8
1981	2.8
1987	2.6
1993	2.5
2004	2.2
1997	1.9
2000	1.7
1998	1.6
1988	1.6
1976	1.5
2002	1.5

Observed Temperature Anomalies in Canada (2005)

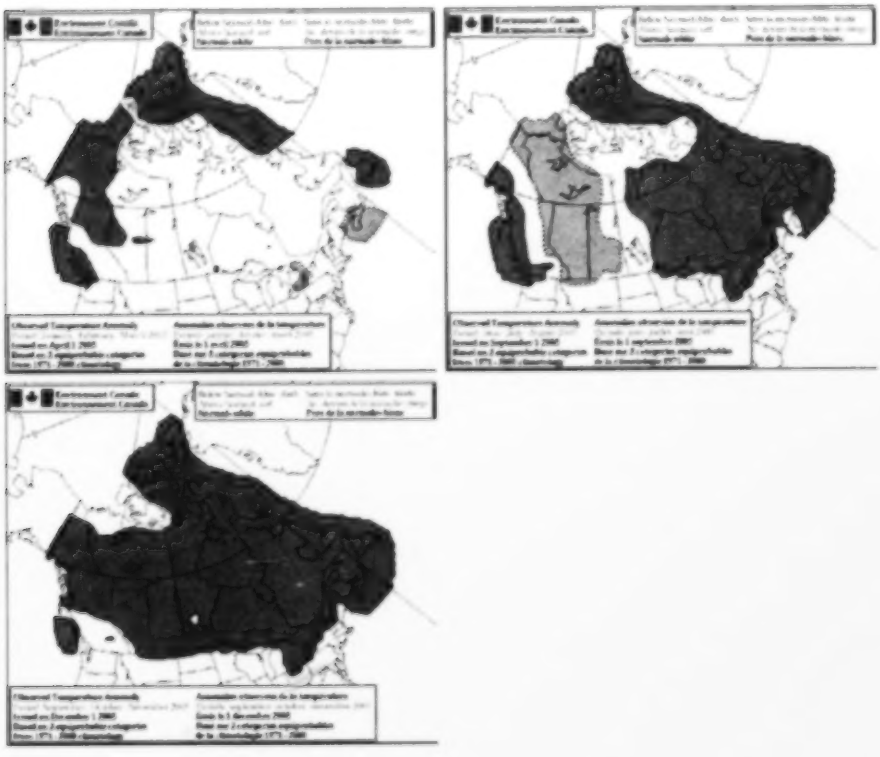
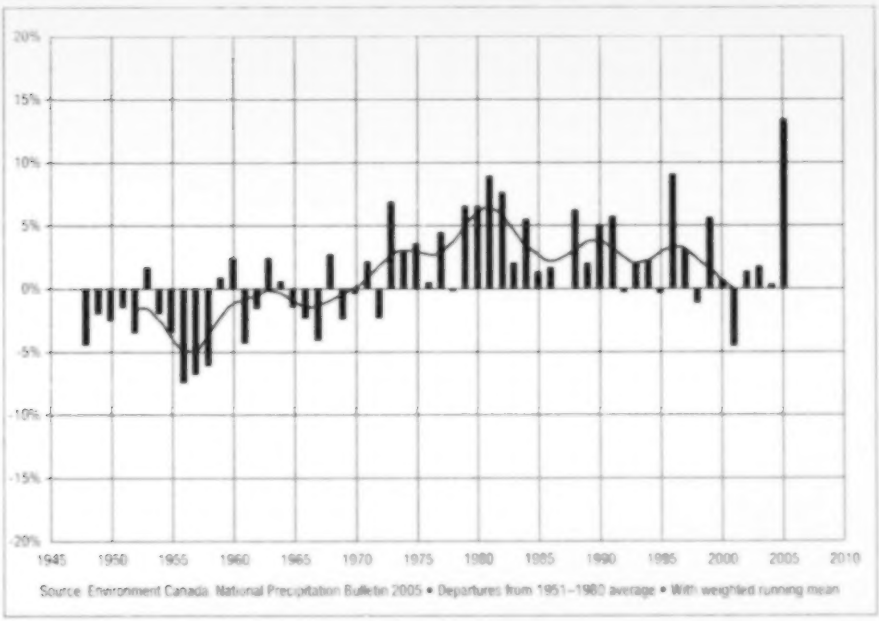


Figure 2.2.2. *Annual National Precipitation Departures with weighted running mean*



HERSCHEL ISLAND TERRITORIAL PARK

Scientists are working hard to develop a better understanding of climate change and its impacts. Herschel Island Territorial Park, located just off the Yukon's North Slope in the Beaufort Sea, is a perfect laboratory for this type of work. Monitoring has occurred in the area for years, and now more and more scientists are looking to Herschel Island as a place to conduct climate change research.

Arctic Coastal Climate Change Monitoring in Northern Yukon

Arctic coastlines are particularly vulnerable to climate change impacts. Dr. Wayne Pollard from McGill University has been investigating ground ice and permafrost conditions in the northern Yukon since the mid 1980s. His research program at Herschel Island and King Point on the Yukon's North Slope is investigating how climate change is, and can, alter the coastal climate system along the south Beaufort Sea and to see how this affects the thawing of permafrost and erosion along the Yukon coast.

Studying Permafrost Conditions at Herschel Island

The Parks Branch of Environment Yukon and Dr. Chris Burn of Carleton University are working together on a collaborative project to investigate permafrost conditions on Herschel Island. They are trying to examine how they have responded to the climate warming experienced throughout the western Arctic since 1970. Their data shows that the mean annual ground temperature on Collinson Head, located on Herschel Island, is -8°C. They have obtained a ground temperature profile to 42 m depth, which shows that the ground has warmed from its previous equilibrium temperature of -10°C. Snow depths at these sites are measured by Park Rangers. The relation between snow depth and ground temperature obtained at Herschel in 2003–04 is precisely the same as obtained at Garry Island, a site that is normally 2°C warmer than Herschel.

In addition to temperature change, the Yukon — and the entire planet — are experiencing significant changes in precipitation trends that may be a result of global warming. 2005 was the wettest year on record for Canada overall. In the Yukon, it was the 5th wettest year ever experienced. These changes in precipitation are important to monitor in order to understand how our environment may respond to alterations in global temperatures.

What is Happening and Why is it Happening?

Canada's National Greenhouse Gas (GHG) Inventory for 2005 shows that emissions in 2004 and 2005 were only slightly higher than 2003. The report suggests that, "the flattening of the growth curve between 2003 and 2005 is due primarily to a significant reduction in emissions from electricity production (reduced coal and increased hydro and nuclear generation), coupled with reduced demand for heating fuels due to warmer winters and a reduced rate of increase in fossil fuel production. Long term growth nevertheless remains significant. Between 1990 and 2005, large increases in oil and gas production have resulted in similar increases in the emissions associated with the production and transportation of fuel for export. In 2005, total emissions associated with these exports were 73 Mt, a 162 percent increase over the 1990 level of 28 Mt. In contrast to the overall increase at the national level, Yukon's greenhouse gas emissions have declined.

Figure 2.2.3. *Ten Most Significant Annual Regional Precipitation Departures in the Yukon since 1948, ranked wettest to driest*

Year	% departure
1974	22.7
1991	21.5
1962	21.2
1997	19.7
2005	19.1
1999	18.3
2000	17.9
1988	17.5
1975	11.0
1961	10.8

Why is it Significant?

The impact of climate change as a result of human-made greenhouse gas emissions is a global, national, regional, local and individual issue. We will all be impacted by it in some way. Overall, it is perhaps the most significant threat that our environment faces. By compiling accurate Yukon greenhouse gas emission data, it helps illustrate how we are making changes to reduce our contributions to climate change. It also helps create an understanding as to how we can develop a low-emission, sustainable Yukon economy.

Taking Action 2003–2005

The Yukon government has been working on its own climate change strategy. It will outline how the government will build on existing programs, activities and experience to respond to the impacts of climate change. The next step will be to outline the specific actions and initiatives that the government will undertake to implement the strategy through the development of a Climate Change Action Plan.

The federal government has made addressing climate change a priority and, as a result, several federal programs have been started that will look for ways to reduce greenhouse gases. The major federal initiative is the One Tonne Challenge, a program that challenges individuals to reduce the amount of greenhouse gases they produce over the course of a year.

New agencies, such as C-CAIRN North Climate Impacts and Adaptations and the Northern Climate Exchange, have also been created since 2000. They develop programs and projects that examine the north's changing environment and look for potential solutions.

3. Water

What is the Issue?

Water management has undergone significant changes in the period from 2003 to 2005. On April 1, 2003, responsibility for water management was devolved to the Yukon government. Prior to that date, water was managed and monitored by the Government of Canada.

What is the Indicator?

The Canadian Water Quality Index (WQI) is a freshwater quality indicator endorsed by the Canadian Council of Ministers of the Environment. The index evaluates water quality for its ability to support freshwater ecosystems, and then ranks waterbodies as excellent, good, fair, marginal, or poor, according to their overall ability to support aquatic life and freshwater ecosystems.

Table 3.1. *Canadian Council of Ministers of the Environment (CCME) Freshwater Quality Index*

Excellent (95–100)	Indicates that water quality measurements never or very rarely exceed water quality guidelines. Aquatic life is not threatened or impaired.
Good (80–94)	Indicates that measurements rarely exceed water quality guidelines and, usually, by a narrow margin. Aquatic life is protected with only a minor degree of threat or impairment.
Fair (65–79)	Indicates that measurements sometimes exceed water quality guidelines and, possibly, by a wide margin. Aquatic life is protected, but at times may be threatened or impaired.
Marginal (45–64)	Indicates that measurements often exceed water quality guidelines by a considerable margin. Aquatic life frequently may be threatened or impaired.
Poor (0–44)	Indicates the measurements usually exceed water quality guidelines by a considerable margin. Aquatic life is threatened, impaired or even lost.

For more details, visit the CCME web site:
www.ccme.ca/ourwork/water.html?category_id=102

More water quality monitoring sites are located in protected areas in the Yukon than the national average, making our water quality consistently higher than the national average. The Yukon's three sites to which the index has been applied are on the Porcupine River upstream of Old Crow, the Liard River at Upper Crossing, and the Dezadeash River at Haines Junction.

In 2005, Environment Yukon and Environment Canada began monthly sampling at new or re-established water quality monitoring sites. This expanded water quality monitoring network will enable a more representative cross-sectional analysis of Yukon's waters and a stronger basis for establishing a WQI for the Yukon. The new sampling stations are located on the Klondike River, the McQuesten River and the Yukon River (one upstream and one downstream of Whitehorse).

In 2003 and 2004, the US Geological Survey (USGS) initiated a comprehensive, multi-year study of the Yukon River Basin designed to develop baseline water quality conditions for climate change indicators and to identify sources of potential contaminants. Environment Yukon provided logistical support to this work.

What is Happening?

Overall Water Quality

The Yukon's Water Quality Report for 2001–2004, compiled by Environment Canada and Environment Yukon, shows that results from all three water quality monitoring stations are rated either good or excellent. The addition of the new sites will increase the ability to more accurately measure water quality in the Yukon.***Figure 3.1.*** *Yukon Water Quality Sample Sites*

Location	Rating	Water Quality Index Scores 2001–2003	2002–2004
Porcupine River upstream from Old Crow	Good	85.6	
Liard River at Upper Crossing	Excellent	100	93.6
Dezadeash River at Haines Junction	Good	89.5	83.8

Data from Yukon Water Quality Report (2001–2004)

Drinking Water

In late 2005, the community of Carmacks had to implement a boil water advisory after 82 wells were tested and were found to contain *E-coli* bacteria. Carmacks has had ongoing water quality problems and as an interim solution has been using chlorine to treat problematic wells as they are identified . However, efforts are being made to examine potential long-term solutions that would offer a sustainable solution for providing safe drinking water to Carmacks.

In 2004, the Yukon government released draft policy guidelines and regulations for Public Drinking Water Systems and the Bulk Delivery of Drinking Water. These regulations will require a public review, which is scheduled to be undertaken in 2006.

Whitehorse City Council officially adopted a Watershed Management Plan for the City of Whitehorse in November 2004. In 2004 and 2005, the City investigated the feasibility of expanding its groundwater supply to totally eliminate the need to use surface water from Schwatka Lake. Preliminary tests have shown that adequate ground water supplies are available to meet the current and long term needs of the City. In 2006, further studies will be conducted to confirm this opportunity. Converting to a 100% groundwater supply system will enable the City of Whitehorse to avoid the costs of constructing and operating a new water treatment plant.

Drinking water for Whitehorse comes from Schwatka Lake and four active wells, located between Selkirk Street and Lewes Boulevard. Generally, the Schwatka Lake water supply is of good quality. However, there can be some seasonal turbidity, coliform concentrations in raw (not treated) water and evidence of *Giardia* from time to time. No *cryptosporidium* cysts were found in the tests. The groundwater supply is excellent with low to moderate hardness, and no evidence of bacterial contamination. The goals of the City's Watershed Management Plan are to:

- Maintain City of Whitehorse source water supplies so that they meet existing Canadian Guidelines for Drinking Water Quality.
- Encourage management decisions that recognize the significance of the riparian zone for water quality protection.
- Protect groundwater quality for current and possible future drinking water sources.
- Re-evaluate stormwater management as a component of community planning with the specific intent of protecting the quality of surface water and groundwater.

The Planning and Development Services Department of the City of Whitehorse is responsible for implementing the Watershed Management Plan.

Water Use

The Yukon Water Board is an independent administrative tribunal established under the Yukon's *Waters Act*. The Board is responsible for the issuance of water licences for the use of water or depositing of waste into water. As in previous years, the highest number of water licences in 2005 were issued to placer mining operations in the Yukon.

Another significant use of water is by communities in the form of general water supply and the subsequent disposal of sewage waste. The following table provides an overview of water supply systems for Yukon communities as well as an explanation of how wastewater is treated and disposed of.

YUKON PLACER AUTHORIZATION

Between 1993 and 2002, the Yukon Placer Authorization (YPA) allowed placer mining activity to alter, disrupt or destroy fish habitat under Canada's Fisheries Act. *In December 2002, the federal government announced that it would be phasing out this authorization. In the wake of this decision, a steering committee was established to examine the development of a new regulatory regime for placer mining in the Yukon. In May 2005, the committee submitted its final report to the Minister of Fisheries and Oceans, which recommended what this new regime should look like. In December 2005, the Yukon Placer Secretariat was formally established. With a small core staff headed by an executive director, this inter-governmental coordinating agency is responsible for planning and leading consultations on the regime and its implementation. It is expected that the new regime will be in place by 2007.*

Figure 3.2. *Summary of Water Supply and Wastewater Treatment Systems*

COMMUNITY	POTABLE WATER				WASTEWATER TREATMENT		
	Supply	**Treatment**	**Distribution**	**Upgrade Plans**	**Primary**	**Secondary**	**Upgrade Plans**
Beaver Creek	Private Wells	None	N/A			Private septic fields	
Burwash Landing	Private wells	None				Anaerobic lagoon	
Carcross	Surface water intake (Bennett Lake)	Filtration and Chlorination	Trucked	Additional treatment		Facultative lagoon	
Carmacks	Private wells	None				Extended aeration plant	New treatment facility
Dawson City	Community wells	Chlorination	Piped and trucked		Preliminary screening		New treatment facility
Destruction Bay	Private wells		N/A			Community cluster septic field	
Faro	Community wells	Chlorination	Piped			Anaerobic lagoons with long term storage	
Haines Junction	Community and private wells	Chlorination	Piped			Anaerobic lagoons with long term storage	
Keno City	Government well	Chlorination	Trucked			On-site septic fields	
Marsh Lake	Community well	Chlorination	Trucked	New surface water supply		Anaerobic lagoon with infiltration cell	
Mayo	Community wells	Chlorination	Piped and trucked			Anaerobic lagoons with long term storage	
Old Crow	Community well	Chlorination	Trucked	Upgrade planned		Exfiltration lagoon & wetland treatment	
Pelly Crossing	Private wells & a community well	Chlorination for community well only	Trucked	New distribution system		Septic pit	Planning for upgrade
Ross River	Community well	Chlorination	Trucked	Upgrade planned		Private septic fields & septic pit	
Tagish	Community well and private wells	Chlorination for community well only	Trucked			Private septic fields	
Teslin	Individual wells	Chlorination	Trucked			Anaerobic lagoons with long term storage and wetland treatment	
Upper Liard	Private wells	None				Private septic fields	
Watson Lake	Community wells	Chlorination	Piped			Anaerobic lagoons with long term storage	
Whitehorse	Surface/ groundwater mix	Chlorination	Piped and trucked			Primary and non-aerated lagoons with long term storage	

DAWSON SEWAGE

In August 2000, the City of Dawson was charged under Section 36(3) the federal Fisheries Act *for depositing a deleterious substance into the Yukon River. Since the turn of the century, the community has pumped raw sewage into the Yukon River. The only treatment done by the municipality is to screen out larger sewage debris. It is estimated that the community generates approximately one billion litres of sewage and wastewater each year.*

The City of Dawson pled guilty to the charge and was sentenced in 2003 to pay a $5,000 fine and build a secondary treatment facility by September 2004. An additional $5,000 fine will be assessed every month after that date until a facility is built. A detailed design of the facility was completed. Because of unsustainable operational requirements, the City applied for and received a variance to the original Court Order for additional time to examine the feasibility of aerated lagoons.

The technical review demonstrated that aerated lagoons were a more viable and sustainable wastewater treatment process for northern communities such as Dawson. The City and the Yukon government have secured the necessary funding for the design and construction of aerated lagoon facility.

The aerated lagoon project is expected to enter the regulatory approval process in the spring of 2007 with construction anticipated starting in 2009. The construction of such a facility is expected to require three construction seasons resulting in a completion date sometime in 2011.

Levels of Sewage Treatment

Screening	Screening removes grit and solid material before sewage receives further treatment or is released into the environment. Screening makes sewage less offensive to the eye, but no less dangerous to the environment or human health. Screening does not significantly reduce the level of suspended solids, biological oxygen demand, toxic pollutants, or microorganisms and pathogens
Primary Treatment	Primary treatment is a physical process through which the sewage flow is slowed down and the solids are separated from the liquids by settling. Settling most often occurs in settling tanks, during which time the heavier particles and solids in wastewater settle to the bottom forming what is referred to as sewage sludge, which can be removed and disposed of in a variety of ways. The settling process reduces faecal coliform levels by 45–55%.
Secondary Treatment	Secondary treatment reduces the amount of suspended solids and BOD by breaking down the organic material present in the sewage. This is done by adding oxygen through mechanical aeration or using biological filters and layers of stones, gravel and sand. The additional oxygen activates the microorganisms present in the sewage, which break down organic matter. Enhanced secondary treatment refers to secondary treatment with phosphorus and/or nitrogen removal. Secondary treatment reduces BOD and suspended solids by 85–90% and removes 90–99% of coliform bacteria and can also remove significant amounts of other pollutants.
Tertiary Treatment	Tertiary treatment further reduces suspended solids, BOD, and other harmful substances such as nitrogen, ammonia, phosphorous, heavy metals and toxic pollutants. The most common methods of tertiary treatment include activated carbon and chemical oxidation.

Information based on The National Sewage Report Card III, 2004

Note: While many of the treatment facilities in the Yukon operate like a primary facility, our long-term storage capacity allows for treatment equivalent to secondary or, in some cases, tertiary treatment facilities.

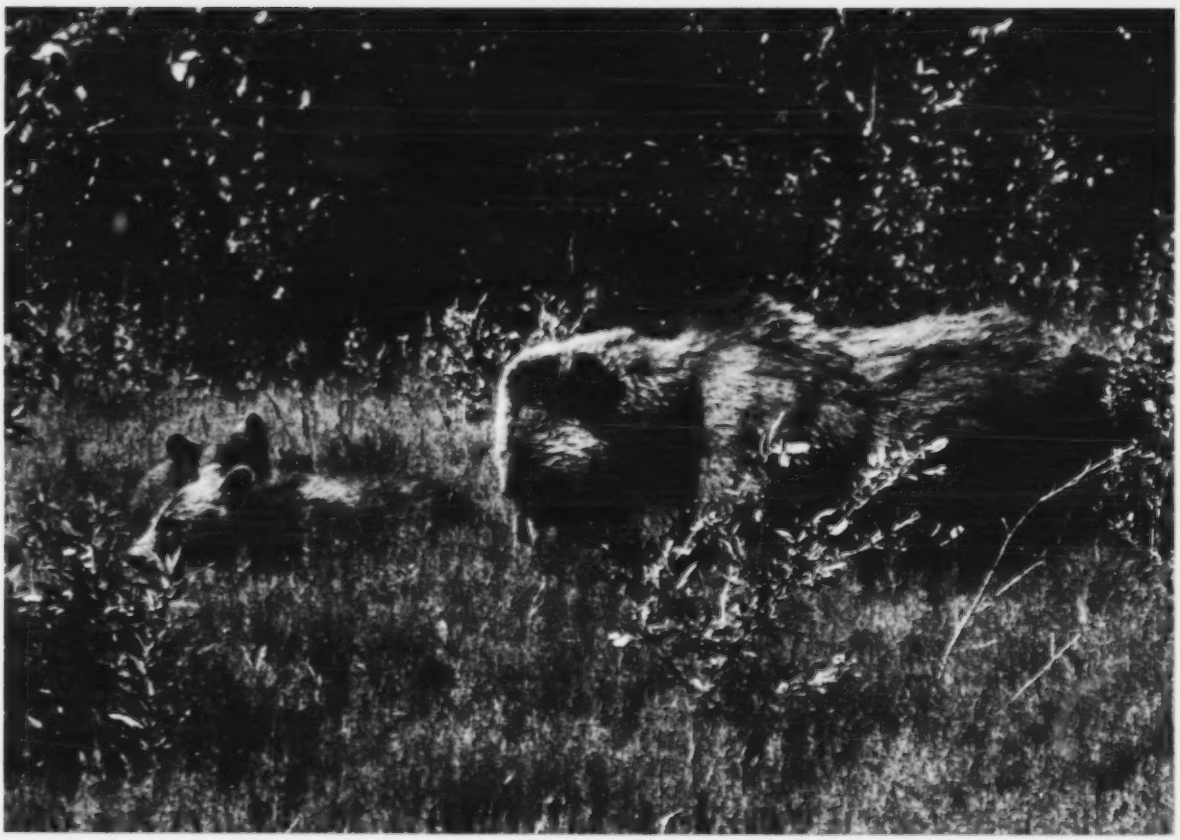
Why is it Significant?

There have been several significant changes related to water and its use in the Yukon. Most important is the fact that the Water Quality Index for the Yukon is now established and this creates an indicator that can be monitored into the future. This will help us understand what is happening with our water quality and identify changes as they occur. Further development of the Index and the monitoring network will continue to be the shared responsibility of Environment Yukon and Environment Canada.

Secondly, there have been significant steps taken to ensure that the quality of our drinking water is protected. This has been done through the creation of draft regulations for drinking water and water delivery, as well as watershed management plans, such as the one created by the City of Whitehorse. These proactive initiatives will help maintain the high standards we currently have in place for drinking water.

Thirdly, there have been major steps taken to ensure that industries that rely heavily on our water resources are carefully monitored and licensed. The creation of a new regulatory regime for placer mining, a major user of Yukon water, is a step forward that reflects the level of importance we place on our water resources. Mine effluent and discharge are also being monitored at old mine sites, such as Faro and Elsa.

Finally, governments and communities are coming together to ensure that wastewater and sewage effluent do not contaminate our water resources. Dawson City in particular, but other communities as well, have moved forward to improve their sewage and wastewater treatment facilities. It is anticipated that more improvements will be seen in upcoming years.



4. Land

4.1 Land Use and Resource Management Planning

What is the Issue?

The sustainability of resource use and development depends on effective planning that considers both current and future human activities as well as environmental protection. Plans related to land use, resources and protected areas generally include an inventory of values, resources and interests, a set of goals and objectives, and strategies intended to achieve these objectives.

What are the Indicators?

The status of Management Plans for:

a) Regional Land Use Plans (RLUPs)

b) Official Community Plans (OCPs)

c) Local Area Plans (LAPs) or Area Zoning Regulations

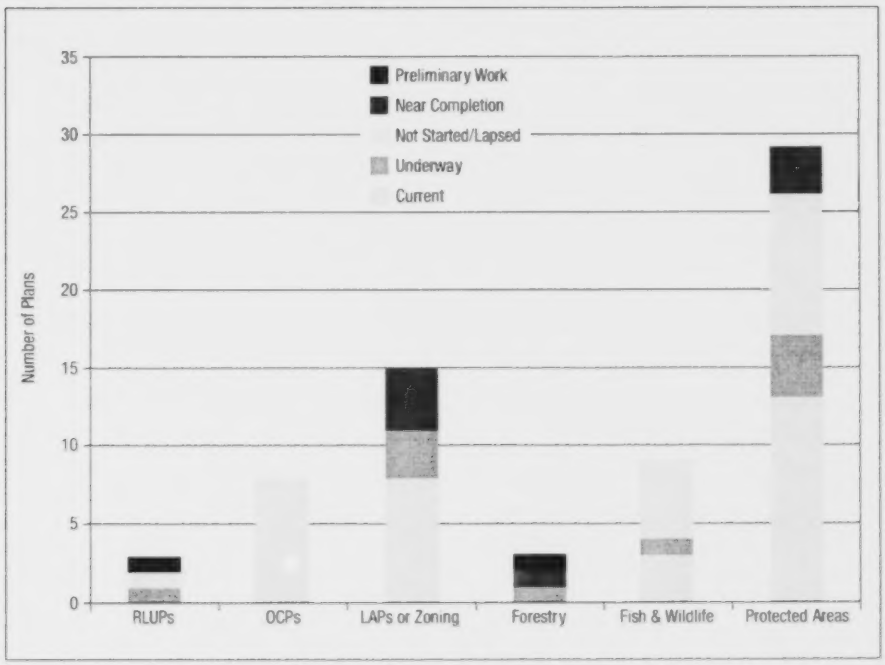
d) Forest Management Plans (FMPs)

e) Fish and Wildlife Management Plans

f) Protected Area Plans.

The plans are divided into five progress categories, as shown in Figure 4.1.1.

Figure 4.1.1. *2004 Status of Land Use and Resource Management Plans in the Yukon*



What is Happening and Why is it Happening?

Regional Land Use Planning

Large scale land use planning is a tool to help pre-empt and resolve land use and resource conflicts, and assists in identifying areas for conservation and development initiatives within a region. Land use planning is included under Chapter 11 of the *Umbrella Final Agreement*. In order to move forward with regional land use planning, all governments must reach an agreement that they are ready to proceed. The Yukon government and affected First Nations work together on these plans to ensure that use of lands and resources is consistent with social, cultural, economic and environmental values. The plans build upon traditional and local knowledge and the experience of the residents of each region, as well as considering the technical and scientific data that may be available for the particular region. Once accepted, a regional land use plan will provide a high level policy framework for land use decisions in the area.

Table 4.1. *Land Use Planning Processes in the Yukon*

Planning Commission	Established	Plan Status
Teslin Planning Commission	2001	Incomplete
North Yukon Planning Commission	2003	Resources assessment and scenarios modeling
Peel River Watershed Planning Commission	2004	Start up and data gathering

Official Community Plans

Under the Yukon's *Municipal Act*, all municipalities are required to have an official community plan. At present, all eight Yukon municipalities have completed official community plans.

Table 4.2. *Official Community Plans in the Yukon*

Community	Plan Approved
Whitehorse	2002
Teslin	1999
Carmacks	2005
Dawson	1996
Watson Lake	1992
Faro	2003
Haines Junction	1995
Mayo	1998

Local Area Plans or Area Zoning Regulations

Local area planning is a form of land use planning undertaken by the Yukon government for unincorporated or rural areas outside of municipalities. It is a collaborative process that includes communities and local First Nations. These plans are policy documents that guide land use in a particular area. They cover relatively small areas, are fairly detailed in nature, and primarily focus on rural settlement issues rather than resource management and landscape level issues that might be addressed in regional, sub-regional and district land use planning.

Area Zoning Regulations are created under the *Yukon Area Development Act*. They define guidelines and standards for how properties can be used. Zoning regulations are intended to implement the policies contained in local area plans. If there are development conflicts or pressures in an area, regulations may be developed in advance of local area plans.

Table 4.3. *Status of Local Area Plans and Zoning Regulations*

Development Area	**Local Area Plan**	**Zoning Regulations**
Deep Creek	Approved 2001	Under Development
Golden Horn	Approved 2004	Under Development
Grizzly Valley	No	Approved 1996
Hot Springs Road	Approved 2002	Approved 2005
Hamlet of Ibex Valley	Approved 2001	Approved 2005
Mayo Road	No	Approved 2005
Hamlet of Mount Lorne	Approved 1995	Under Development
Whitehorse Periphery	No	Approved 1978
Bear Creek	No	Approved 1983
Dempster Highway	No	Approved 1979
Destruction Bay	No	Approved 1980
Klondike Valley	No	Approved 1992
Mayo	No	Approved 1976
Mendenhall	No	Approved 1990
Pine Lake	No	Approved 1990
Ross River	No	Approved 1978
West Dawson	No	Approved 1990
M'Clintock Place	No	Approved 1996
Jackfish Bay	No	Approved 2000
Carcross General Development Area	No	Approved 1976

Forest Management Plans

Yukon and First Nation governments are working jointly to develop forest management plans that will apply to both First Nation and public lands. The territory is divided into 13 forest management units and 14 First Nation traditional territories. The Yukon and First Nation governments are responsible for the final approval and implementation of forest management plans for lands under their jurisdiction.

Table 4.4. *Status of Forest Management Planning in the Yukon*

Plan	**Status**
Kaska Forest Resources Stewardship Plan	In progress
Strategic Forest Management Plan for the Teslin Tlingit Traditional Territory	In progress
Southwest Yukon Forest Management Plan	Approved by CAFN and YG in the fall of 2005

Fish and Wildlife Management Plans

The implementation of Yukon First Nation Final Agreements and transboundary final agreements with the Inuvialuit and Tetlit Gwich'in has led to a new approach to the management of fish and wildlife in the Yukon. These agreements spell out the requirements for the Yukon government, First Nations, Renewable Resources Councils and the Yukon Fish and Wildlife Management Board to collaborate and coordinate the management of fish and wildlife populations.

Community-based fish and wildlife management plans are operational work plans developed in communities to address fish and wildlife management concerns for traditional territories where First Nation Final Agreements are in effect. These plans are developed collaboratively by First Nations, Renewable Resources Councils and the Yukon government. Plans address community-based management concerns that may include species management, harvest, wildlife viewing, community involvement and/or trapping. Species management plans (e.g. wood bison) are developed to address management issues unique to a species or population, and may be required under legislation, such as the federal *Species at Risk Act*. All plans have been developed in Yukon communities with participation by local residents, stakeholders and governments and offer a widely-supported approach to management.

Table 4.5. Status of Fish and Wildlife Management Plans

Community Based Fish and Wildlife Management Plans	**Approved**	**Status**
Mayo Fish and Wildlife Management Plan	2002	Current
Aishihik Integrated Fish and Wildlife Management Plan	1999	Review complete
Teslin Integrated Fish and Wildlife Management Plan	2000	Review complete
Alsek Moose Management Plan	1997	Review complete
North Yukon Fish and Wildlife Management Plan	2001	Review complete
Little Salmon/Carmacks Fish and Wildlife Management Plan	2004	Current
Species Plans	**Approved**	**Status**
Porcupine Caribou Management Plan	2000	Requires Review
Southern Lakes Caribou Recovery Program	1992	Current
Wood Bison Management Plan	1998	Review complete, new plan under development
Management Strategy for Elk (*Cervus canadensis*) in the Yukon	No	Under Development

Protected Areas

Protected areas in the Yukon include territorial and national parks, Habitat Protection Areas (HPAs), and national wildlife areas. Most of the Yukon's protected areas originated as Special Management Areas through First Nation Final Agreements. Depending on the specifics of the agreement, the federal or Yukon governments, or both, work with First Nations to develop management plans for these areas to ensure their effective implementation and ongoing operations.

Table 4.6. *Status of Parks and Protected Areas Plans*

Protected Area	Protection Status	Designated	Management Plan
Kluane National Park	Permanent	1972	2004
Ivvavik National Park	Permanent	1993	2004
Vuntut National Park	Permanent	1995	2004
Herschel Island-Qikiqtaruk Territorial Park	Permanent	1987	Under Review
Coal River Springs Territorial Park	Permanent	1991	Draft Complete
Tombstone Territorial Park	Permanent	2004	Draft Complete
Kusawa Territorial Park	Permanent	No	No
Agay Mene Territorial Park (includes most of the land comprising Kluane Wildlife Sanctuary)	Undetermined	No	No
Asi Keyi Territorial Park	Permanent	No	No
Nii'iinlii'njik (Fishing Branch) Ecological Reserve	Permanent	2003	2004
Nii'iinlii'njik (Fishing Branch) Wilderness Preserve	Permanent	2003	2004
Fishing Branch HPA	Management Plan	2004	2004
Old Crow Flats SMA	Interim protected	No	Under Development
Łhútsäw Wetland HPA	Interim protected	No	Draft Complete
Horseshoe Slough HPA	Interim protected	Yes	2001
Ta'tla Mun SMA	None required	No	2001
Ddhaw Ghro HPA (McArthur Wildlife Sanctuary)	Interim protected	No	Under Development
Nordenskiold HPA	Interim protected	No	Draft Complete
Tagish River Narrows HPA	Interim protected	No	No
Lewes Marsh HPA	Interim protected	No	No
Pickhandle Lakes HPA	Undetermined	No	No
Nisutlin Delta National Wildlife Area	Management Plan	1995	2004

Why is it Significant?

The development of long-term plans through responsive public processes is a proactive way to manage competing views about whether and how lands and natural resources within Yukon's regions should be used. Regional planning needs to reflect traditional and local knowledge, experience and recommendations of residents, scientific data where available, as well as broad socio-economic and environmental policy aspects of decisions made with respect to land use. This ensures that governments and First Nations authorize land use plans that are consistent with social, cultural, economic and environmental values, including those based on sustainable development.

Taking Action 2003–2005

The implementation of Yukon First Nation land claim agreements has created an opportunity for learning and advancing planning activities. Activities such as land use planning, forest planning, and protected areas planning under various land claim agreements have increased the Yukon government's focus on these types of activities. As the post-devoloution and post-land claim government structure in the territory continues to evolve, these planning processes will lay the groundwork for increased cooperation and understanding between the various management agencies.

4.2 Land Use Quality Index (Indicator Under Development)

What is the Issue?

It is relatively easy to measure the level of land-based planning in Yukon; it is more difficult to evaluate the success of the resulting plans. A land use quality index could measure such things as wilderness fragmentation, human settlement change, extent of protected areas, access, and changes in land tenure. This indicator has yet to be finalized.

4.3 Solid Waste Management

What is the Issue?

Under the *Municipal Act*, municipalities must operate solid waste disposal facilities for their residents. Eight communities outside of Whitehorse operate their own solid waste disposal sites. All are unstaffed except Mt. Lorne and Marsh Lake. None of these landfills have a scale, so tracking the amount of waste entering the landfill and comparing year to year is not possible. Community Services operates 20 solid waste facilities across the Yukon, most of which currently compact, bury and burn domestic garbage and most of which have also been equipped with wildlife exclusion fencing. Many communities have recycling depots. Destruction Bay, Tagish, and Mt. Lorne also have Free Stores, allowing for reuse of items that people have donated.

Managing solid waste starts long before it reaches the landfill. As consumers and businesses choose to reduce, reuse, and recycle, the life of Yukon's landfills are extended. Disposing of our waste is costly, whether the waste is composted, sent to landfills, or diverted to recycling.

Solid Waste Management in the City of Whitehorse

The City of Whitehorse has set a target of 50% diversion of waste to its landfill through recycling or composting. Raven Recycling Society, a local non-profit organization, along with P & M Recycling, Salvation Army and Computers for Schools, offers Whitehorse residents the opportunity to recycle more than 30 materials. This is a much larger number than other municipalities of similar size elsewhere in Canada. However, there is still room for improvement, as many of the programs target single family residential units. There is opportunity for the institutional, commercial and industrial (ICI) sectors to participate in waste reduction programs such as recycling cardboard, construction materials and other commercial/industrial detritus, and also some opportunity for composting. Waste reduction efforts from the ICI sectors remain limited in Whitehorse.

What are the Indicators?

Total annual tonnage of waste (Figure 4.3.1) arriving at the City of Whitehorse Landfill

Figure 4.3.1. *Total tonnes entering the City of Whitehorse landfill*

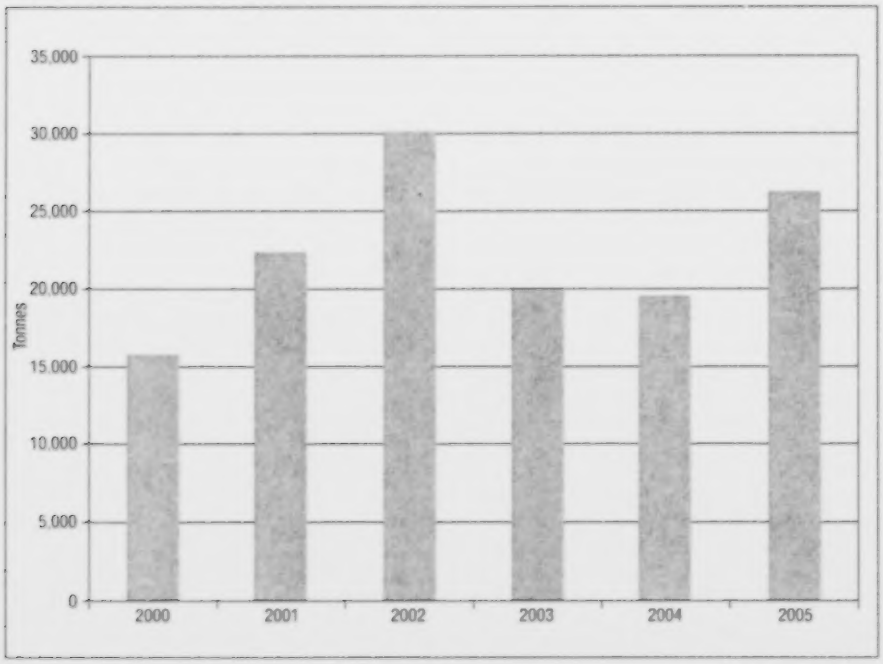
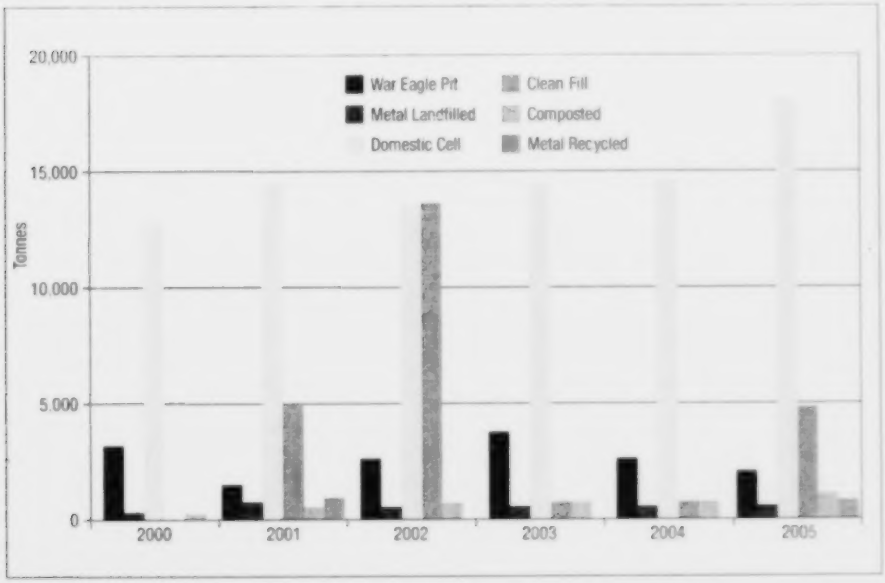


Figure 4.3.2. *Allocation of Materials within the City of Whitehorse Landfill*



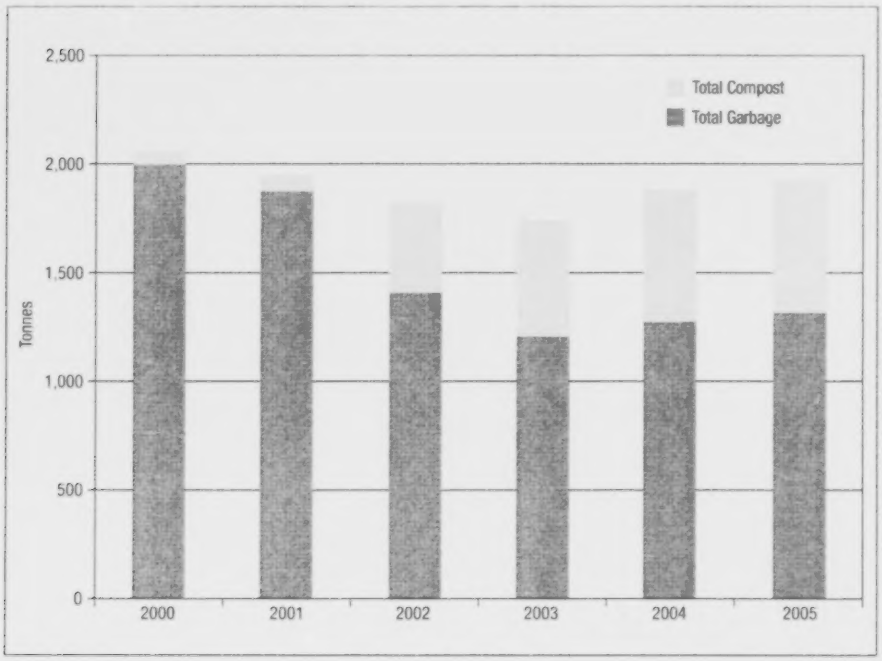
What is happening?

Data for 2002 and 2005 show more waste entering the landfill than other years. This is likely reflective of large construction projects in those years. The Canada Games Centre was under construction in 2004, and the Athletes Village for the 2007 Jeux de Canada Games was under construction in 2005. Planning started in 2005 towards making the 2007 Jeux de Canada Winter Games the first "green" games, with planning underway to ensure that Whitehorse had the recycling and composting infrastructure in place to handle the anticipated volumes.

Without those two construction projects, it appears that the total amount of tonnes of waste entering the landfill is slightly decreasing. Until May 2002, curbside compostable collection was limited to volunteers and a pilot program (approximately 500 households). Beginning in May 2002, the City of Whitehorse started alternate week collection city wide, one week garbage, the following week compostables.

By the end of 2005, a stabilizing trend begins to appear in terms of small annual increases in the amount of material composted versus landfilled per household, as seen in Figure 4.3.3.

Figure 4.3.3. *Total garbage[1] and compostables (kg) collected from 5,000 households receiving City curbside collection*



In 2001 and 2005, quantities of recycled metals are recorded at the municipal scales. The City of Whitehorse stockpiles its metal for recycling and, when quantities warrant, issues a metal salvage contract. The metal is crushed, formed into blocks, and exported. Thus the amounts appearing in 2001 and 2005 represent the amount of metal that was available to be recycled over several years.

In 2005, Raven Recycling Society purchased a new cardboard tent, which allows this non-profit society to process more cardboard. By the end of 2005, Raven Recycling Society recognized that the main obstacle to increasing recycling in Whitehorse was the lack of convenient services such as neighbourhood 24-hour drop off spots and blue box collection programs.

The City of Whitehorse coordinates three Household Hazardous Waste collection days annually, with technical and staff support and funding assistance from Environment Yukon. All communities in the Yukon are eligible for assistance from Environment Yukon if they wish to coordinate similar events.

Why is it Significant?

The plateau effect of residential composting and recycling means that new initiatives must be implemented if further landfill diversion is desired. The commercial and industrial sectors contribute only a small part of the total amount diverted. Figure 4.3.4 shows the total percent of garbage diverted from the Whitehorse landfill from 2000 to 2005. It indicates a significant leap in diversion rates coincidental with the City implementing its curbside composting program.

[1]Garbage means all items that were not separated for composting, or recycling, or that were not received during household hazardous waste (HHW) collection days.

Figure 4.3.4. *Percent Diversion from City of Whitehorse Landfill*

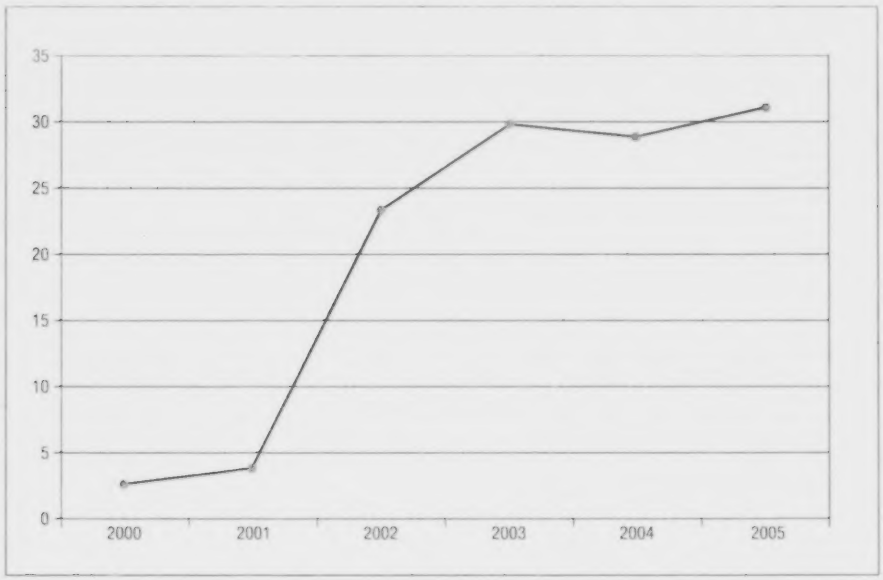
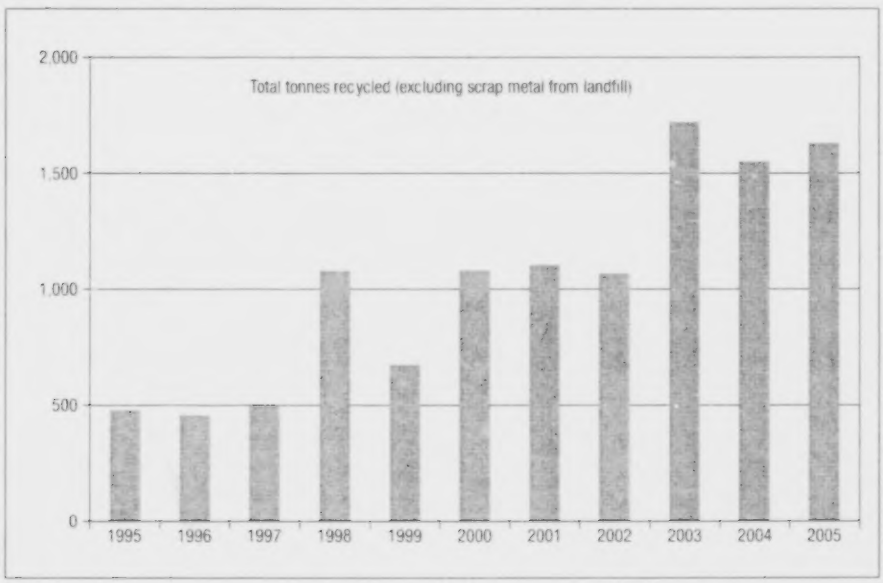


Figure 4.3.5. *Total tonnes recycled at Whitehorse recycling depots*



Data Quality

Data is for the City of Whitehorse area only and does not represent what is happening in the communities. The recycling and composting values are minimums, as some businesses ship cardboard directly back to major warehouses, and do not enter the recycling centres' warehouses to be included in their weights. Similarly, composting values do not include backyard composting.

5. Nature

5.1 Contaminants in the Environment

Since 1992, the federal and Yukon governments have been supporting the Northern Contaminants Program. Originally focused on the Finlayson Caribou Herd, the program has also looked at contaminants in other country foods. By the end of 2005, the program was focused on monitoring temporal and geographical trends using caribou and moose as key species.

What are the indicators?

In the moose and caribou contaminants study, presence and quantity of selected contaminants are the primary indicators. Gamberg (2006) describes each of these elements and why they are suitable indicators.

Arsenic is generally considered a non-essential element; however, it has been identified as an essential trace element for domestic goats (Puls 1994). It can be absorbed by ingestion, inhalation and permeation of skin or mucous membranes and accumulates in the liver, kidney, spleen, muscle, skin and hair. Toxic effects include respiratory cancer, peripheral nervous system disorders and dermatitis (Jaworski 1980). Toxicity depends on the concentration and form. Elemental arsenic is non-toxic. Since the use of arsenic in herbicides, insecticides, fungicides and rodenticides has been largely discontinued, the main sources of arsenic in the environment are mine tailings, smelter waste and natural mineralizations (Jaworski 1980).

Cadmium is a toxic element that accumulates in animals over time (and therefore with age), primarily in the kidneys and liver. Chronic exposure may lead to a variety of problems, including bone-density loss and kidney damage. Long-range transport distributes cadmium widely over the environment, and natural mineralizations may serve as point sources. Lichens absorb cadmium directly from the air, eventually passing it on to caribou that feed on the lichen. Plants differ in their ability to absorb cadmium from soil and water, with some species accumulating relatively high concentrations if they grow in cadmium-rich soil. Cadmium accumulates in long-lived herbivores, generally not in high enough levels to impair their health. Industrial uses of cadmium include production of cadmium-plated metal, nickel-cadmium batteries, pigments and plastic stabilizers, and mining and refining of copper, lead and zinc (Jaworski 1980).

Copper is an essential element. Excess copper is excreted in the urine, and toxicity is rare under normal conditions. Toxic effects may occur, however, and can include dermatitis, anemia, gastric ulcers, and kidney damage (Aaseth and Norseth 1986). Copper deficiency has been noted in some Alaskan moose with reduced reproductive rates (Flynn et al. 1977). Industrial uses include production of electrical equipment and alloys, plating, plumbing, heating, and uses in mining and smelting.

Lead is a toxic element that is stored for the long term in bone tissue and, in the short-term, in the liver and kidney. Toxic symptoms include anemia, anorexia, fatigue and blindness. Common sources of lead include mining, smelting and refining of lead and other ores, burning petroleum fuels containing lead additives, burning coal and oil, and use in shotgun pellets. Lead may also be found in paint (even 'lead-free paint may contain up to 1% lead), waste engine oil, lead batteries, putty, roofing tiles, linoleum, solder and golf balls. Some pipe joint or thread compounds (used on drilling sites) can contain up to 40% lead powder (Puls 1994).

Mercury is a toxic element that accumulates in the brain and in kidney tissue, affects neurological functions and may cause gastrointestinal disturbance, reduction of food intake, poor growth, kidney damage or death. Prenatal exposure may lead to cerebral palsy (Berlin, 1986). Inorganic mercury may be transformed to methylmercury (a more toxic form of mercury) by natural microbial action in lakes. Aquatic life is generally more sensitive to methylmercury than terrestrial species. Environmental sources of mercury include mining, milling and smelting of mercury-containing ores, chlor-alkali plants, coal-burning plants, municipal wastewater treatment plants, pulp and paper mills and fungicides. Natural mercury occurs as volcanic gases, natural mineralizations and evaporation from oceans (World Health Organization, 1989).

Selenium is an essential element, which interacts with vitamin E to ensure optimum functioning of the immune and reproductive systems. Because some geographical areas are naturally low in selenium, deficiencies are possible, causing reduced growth and reproductive rates, and reduced immune response. Signs of toxicity may include emaciation, lameness, cracked or deformed hooves and loss of hair. Industrial uses of selenium include electronics, photography, glass production, fungicides, insecticides and pigments in plastics, paints, enamels, inks and rubber.

Zinc is an essential element, and is an important component of many proteins and enzymes. Zinc deficiency may result in reduced conception rate, reduced feed intake and growth rate, and thickening and shortening of bones. Toxic effects include anemia, poor bone mineralization, arthritis, and lameness (Sileo and Beyer 1985). Zinc is released into the environment through mining, smelting and residential and industrial effluents.

What is Happening?

Yukon hunters were asked to submit an incisor bar (front teeth), and a kidney, liver and muscle sample from caribou and moose killed in the 2005 hunting season. Funding was available to analyze 20 livers from the Porcupine Caribou Herd. Other samples were frozen and stored for future analysis. Results indicated that for every element except copper and cadmium, levels should be considered normal background levels that would not pose any toxicological concern from animals (Gamberg, 2006). However, if enough caribou livers and kidneys were consumed, cadmium levels were high enough to pose a potential health risk. Health Canada therefore issued a health advisory limiting consumption of these organs.

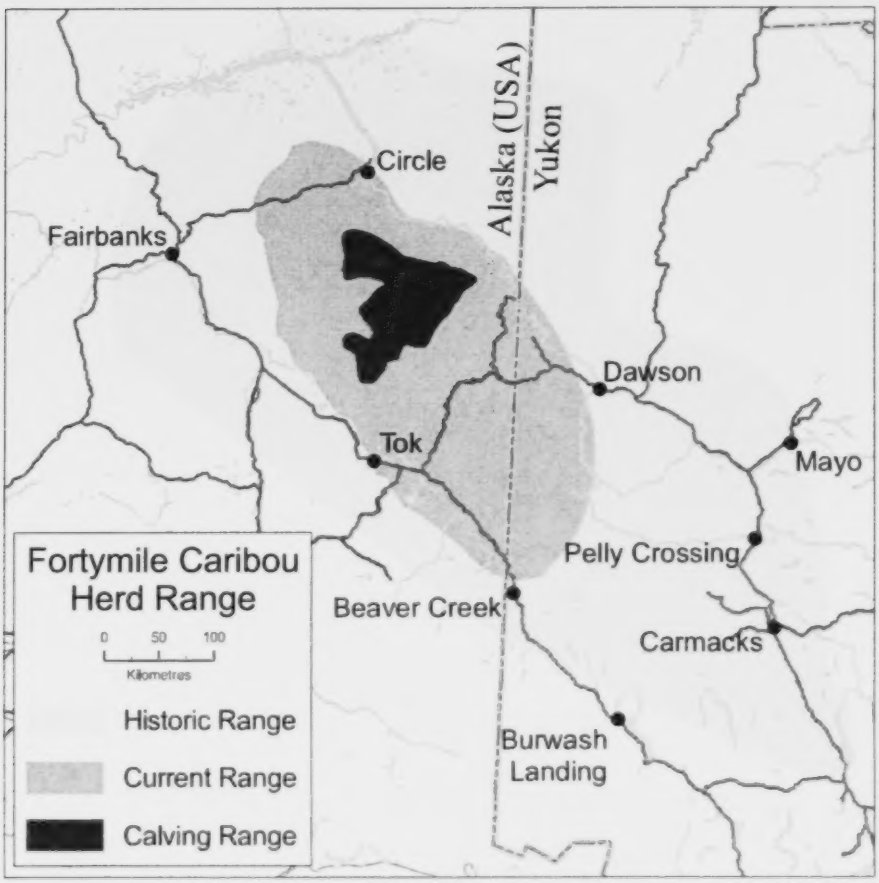
Copper concentrations measured in the herd were very low, to the extent that some individuals in the herd could be considered copper deficient. When this information was analyzed with data from previous years, it became apparent that seasonal variations existed in the levels of elements. Gamberg (2006) suggests that this, "may be related to differential uptake of some elements by lichens and other caribou forage during the summer months, and/or seasonal differences in kidney weights." Gender differences in arsenic, cadmium, copper, lead and mercury were noted, with presence being significantly higher in female caribou. According to Gamberg (2006), "this may be related to the higher energy demands of females, and the resulting higher requirement for food relative to body weight."

Arsenic in kidneys showed a significant decline over time while mercury in kidneys showed a significant increase in female caribou, but not in males. Concentrations of both elements may be varying over time in a cyclic rather than a linear fashion. Continuing to monitor these caribou on an annual basis should help to clarify these apparent trends (Gamberg, 2006).

Spotlight on: The Fortymile Caribou Herd Recovery

The Fortymile Caribou Herd's historic range extends from the White Mountains north of Fairbanks to Whitehorse, Yukon, encompassing a tributary of the Yukon River known as the Fortymile River. This once huge herd is making a comeback thanks to cooperative efforts on both sides of the Alaska/Yukon border.

Map 5.1. *Fortymile Caribou Herd Range*



The first counts in the early 1900s estimated up to half a million animals in the herd. By the late 1960s this number had dropped to 7,000 animals. The herd, once an important food source, was closed to hunting.

While overhunting, overgrazing, severe weather, and predation were all contributing factors in the herd's decline, "some biologists theorize that the 1960s hunting reduced the population to a level well below where it would have bottomed out during a natural decline, and to a point where the force of predation prevented the herd from ever increasing again — a condition called a *predator pit*. After a limited wolf control program in part of the herd's range in the early 1980s, the herd rebounded to 22,000 animals" (Farnell, 2003).

As more evidence was gathered to support the predator pit theory, biologists and wildlife management partners began to believe that if the herd could grow to between 50,000–60,000 animals, it might escape the predator pit. Since so much of its range had been unused for so long, it could clearly support a herd many times larger than the existing number of animals. There were many compelling reasons (biodiversity, and wildlife viewing opportunities, for example) to attempt a herd recovery. Thus, the International Fortymile Planning Team was created.

Involving fish and wildlife managers, several different levels of government and communities in both Yukon and Alaska, the team established a recovery plan for the herd with the ultimate goal being to restore it to its former range. The recovery plan used two main instruments — hunting restrictions and publicly acceptable methods of wolf control — towards achieving their goal. First Nations hunters in the Yukon voluntarily restricted their harvest in support of the recovery efforts.

Having the herd cross the Yukon River was seen as a major goal of the recovery program. By 2001, the herd was estimated at over 40,000 animals. In 2002 approximately 30,000 caribou crossed the river. The last reliable herd count was in 2003, with a herd count of 43,000 animals. These numbers are expected to continue to climb.

A First Nation working group was created in 2005, to make recommendations to the Minister and Tr'ondek Hwech'in in relation to the utilization and implementation of habitat protection measures that may contribute to the efforts to promote the growth of the Fortymile Caribou Herd.

5.2 Species at Risk

5.2.1 What is Happening?

Across the globe, thousands of plant and animal species are at risk of becoming extinct.

Habitat destruction is a major reason these species are at risk, along with genetic and reproductive isolation, environmental contamination, over harvesting, climate change, disease and the presence of invasive species.

According to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), there are 539 plant and animal species at risk in Canada. Across Canada, teams of specialists and community members are working hard to protect species at risk. In 1998, the Yukon government signed the National Accord for the Protection of Species at Risk, signifying its commitment to designate species at risk, develop plans for their management, and enact legislation for their protection.

In 2003, the federal *Species at Risk Act* (SARA) came into effect. Under this act, COSEWIC assesses species considered to be at risk and makes recommendations on their status to the federal government. The species can be listed as: Special Concern, Threatened, Endangered, Extirpated, and Extinct. The federal Cabinet makes the final decision on whether a species is added to the List of Wildlife Species at Risk.

In the Yukon, the territorial government is in the process of developing its own Species at Risk legislation. By doing so, the territory can meet the obligations set out in the National Accord for the Protection of Species at Risk. This will ensure that responsibility for monitoring and managing these species is carried out within the territory's wildlife management framework.

Yukon Species at Risk (as Identified by COSEWIC)

Species	Status	Management Plan
Eskimo Curlew	Endangered	No
Bowhead Whale	Threatened	No
Wood Bison	Threatened	Yes
Peregrine Falcon	Threatened	No
Baikal Sedge	Threatened	No
Northern Mountain Caribou	Special Concern	Some Populations
Grizzly Bear	Special Concern	No
Polar Bear	Special Concern	No
Wolverine	Special Concern	No
Short-eared Owl	Special Concern	No
Western Toad	Special Concern	No
Bering Cisco	Special Concern	No
Squanga Whitefish	Special Concern	No

Source: COSEWIC and Environment Yukon

RARE PLANTS OF THE YUKON

One of Canada's rarest plants, Yukon whitlow-grass (Draba yukonensis), was rediscovered in 2005 after a 48 year absence. Last seen in 1957, this small annual plant is apparently only found in one meadow just outside Kluane National Park and Preserve. The species is endemic to Yukon but has no protection. Initially less than 20 plants were found but subsequent surveys have uncovered several hundred. Even though the region has been widely searched no new populations have been found. Presently 54% of Yukon's endemic plant species are not within a protected area.

5.2.2 Why is it Happening?

In order to ensure the effective protection of species at risk, different tools are required at the territorial, national and international level. For example, a local population of a particular species may be healthy, but on a national scale the species may be at risk.

5.2.3 Why is it Significant?

By creating its own legislation for species at risk, the Yukon will have significant input into how these species will be dealt with in the territory. It will also ensure that traditional and local knowledge will play a role in these processes. This will help recovery plans and management strategies clearly reflect the realities of the Yukon environment and the values of Yukon people.

5.2.4 What is Being Done About it?

The Yukon government is currently conducting a public consultation regarding proposed Species at Risk legislation. It is expected that the consultation will wrap up by the end of 2005.

In 2005, the following projects were funded by the Habitat Stewardship Program:

- **Aishihik Wood Bison Stewardship Project: Southwest Yukon**
  Champagne and Aishihik First Nation

  The Champagne and Aishihik First Nations carried out field trips and on-the-ground monitoring as part of effective management of this re-introduced bison population. This knowledge complements western science surveys and provides direction for wildlife managers on the future of this growing population and other species in the Aishihik area.

- **Chisana Caribou Recovery Program**
  White River First Nation

  The Chisana herd, a small population of woodland caribou inhabiting east-central Alaska and southwestern Yukon, appear to be in sharp decline, dropping from an estimated population of 1800 in 1989 to about 350 animals more recently. Recent studies have demonstrated that the Chisana herd is genetically unique and distinguishable from other Yukon caribou herds. The goal of the project, which is a cooperative effort between government agencies in Yukon and Alaska and the White River First Nation, is to facilitate recovery of the herd through intensive field programs. These programs include increasing calf recruitment by keeping cows and newborn calves in temporary enclosures to protect them from predators, community involvement, and public education. Local groups of schoolchildren are helping by collecting lichens — the preferred forage — for the penned caribou. They are learning about caribou biology, caribou recovery efforts, and participating in the conservation of the herd.

- **Yukon North Slope Grizzly Bear Project**
  Wildlife Management Advisory Council — North Slope

  This five-year project addresses goals of the grizzly bear co-management plan by: assessing the health of the population of grizzly bears on the North Slope; reducing human-caused grizzly mortality; developing a monitoring program for bear mortality, abundance, habitat use, and behaviour; and generating a locally-based stewardship program and management strategy for North Slope grizzly bears.

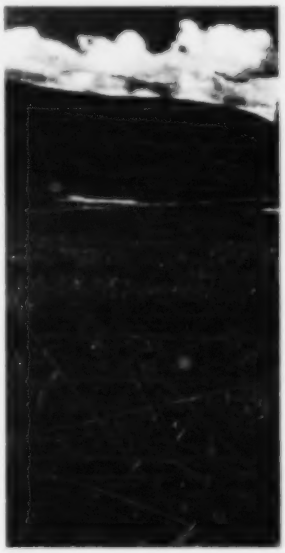
FEDERAL HABITAT STEWARDSHIP PROGRAM FOR SPECIES AT RISK

As part of Canada's national strategy for the protection of species at risk, the federal government established the Habitat Stewardship Program (HSP) for Species at Risk. This program distributes up to $10 million per year to projects that conserve and protect species at risk and their habitats.

5.3 Wetlands

5.3.2 What is Happening?

The Yukon is a mountainous region and wetlands cover only a small percentage of our total land area. However, these wetlands play an important role in the functioning of our overall natural environment, in the traditional human use of areas and in current local economies. Functioning, intact wetland ecosystems maintain water flows, protect areas from floods, purify water, recharge groundwater and provide habitat for fish and wildlife. In the past, wetlands were important areas for First Nations because they often found the animals and plants they relied on for food in these areas. Today, wetlands continue to provide important habitat for animals that people hunt and trap.



Because of the great value of wetlands, international agreements for their conservation have been established. These agreements call for the maintenance of ecological processes, the preservation of biological diversity and the sustainable use of wildlife populations and ecosystems. In 1991 the federal government introduced the *Federal Policy on Wetland Conservation* that directs all federal departments to incorporate wetland conservation into their decision-making. Federal responsibility for public lands, water, forestry, mineral resources and environmental assessment devolved to Yukon government on April 1, 2003. The federal wetland policy was not adopted by the Yukon government upon transfer of authority. The Yukon government has been working towards developing a framework for wetland conservation through the interagency Wetlands Technical Committee.

CELEBRATION OF SWANS 2005

One of the most important wetlands in the Southern Yukon is the M'Clintock Bay and Lewes Marsh area north of Marsh Lake. Each spring, it is one of the first ice-free areas and provides an important staging area for migratory birds, including swans.

Celebration of Swans is an annual community-driven festival of wildlife viewing and appreciation coordinated by the Yukon Department of Environment's Wildlife Viewing Program, in partnership with the Girl Guides and Yukon Energy Corporation and supported by many non-profit organizations, local businesses and dedicated volunteers. Many of the Celebrations' activities are focused at Swan Haven Interpretation Centre on the shore of M'Clintock Bay. The centre has grown to become one of the most important accessible wildlife-viewing sites in the Yukon. Nearly 10% of Yukon residents visit the centre annually, including nearly 1,000 school children. The centre and celebration have become powerful tools for interpreting the spectacle of spring and raising awareness of area wildlife.

In 2005, the Department conducted a visitor survey, which found that the social and educational aspects of the Celebration of Swans are considered to be very important to participants. The majority of visitors to Swan Haven at Marsh Lake were Whitehorse residents, 30–60 years old. Some were keen birders, others were more focused on the family-oriented events offered. There were also a significant number of new Whitehorse residents exploring the sights and events of their new home, and residents hosting visiting friends and relatives.

The most popular event in 2005 was Family Day with 450 participants, followed by Homes for Birds and Bats with 150 participants. The Seniors' Tea was also well attended, with 70 participants, as were the film showing of Winged Migration *and the art exhibit opening with 50 participants each.*

5.3.3 Why is it Happening?

In many parts of Canada, there has been a substantial loss of wetlands as a result of drainage for urban expansion, agriculture, and other types of development. The wetlands in the Yukon are relatively intact and, while they have demonstrated importance to local ecosystem function, they potentially have a significant high value nationally and internationally as important habitat for migratory birds.

Federal and territorial governments, as well as non-government agencies are conducting more detailed inventories of these wetlands and their use, in order to help develop a better understanding of the overall importance of Yukon wetlands.

In addition, several Yukon First Nation land claim agreements identify wetlands as Special Management Areas because of their traditional and current importance to local communities. As implementation of these land claim agreements moves forward, management plans and conservation guidelines for these areas are being developed.

5.3.4 Why is it Significant?

Wetlands help purify water, stabilize hydrological processes, and provide food and habitat for a variety of fish and wildlife species. In the Yukon, there is an opportunity to manage these important resources carefully to ensure they are not lost.

By working towards identifying the location and the values associated with these wetlands in the Yukon, appropriate measures can be taken to ensure their proper management and possible protection, as the case requires.

Establishing wetlands as protected areas underlines their significance to Yukon First Nations and other Yukoners and will only help increase awareness of the importance of wetlands to the Yukon environment, local economies, and migratory wildlife populations.

5.3.5 What is Happening?

The Yukon Wetlands Technical Committee, which includes members from federal and Yukon government agencies, as well as Ducks Unlimited and Yukon College, is carrying out wetland inventories throughout the territory. In 2005, the Yukon Wetlands Technical Committee also began working on a database of the key wetland areas in the Yukon. The wetland summaries are a compilation of existing data and knowledge about these sites that will help in the planning and decision-making processes.

As per land claim obligations in the Na-Cho Nyäk Dun First Nation Final Agreement, a management plan for the Horseshoe Slough Habitat Protection Area was completed in 2001. In 2005, a management plan for the Łhútsäw Habitat Protection Area was completed, but has not yet been formally agreed to by the relevant governments. Planning is also underway for the Old Crow Flats Special Management Area, and the Nordenskiold Habitat Protection Area. In addition, a community sponsored proposal for the Devil's Elbow/Big Island wetland area in the Stewart River floodplain was received in 2004 and planning for the area began in 2005.

DEVIL'S ELBOW INTERPRETIVE SITE

For the past 10 years the community of Mayo, including the local Renewable Resources Council, Na-Cho Nyäk Dun First Nation, and others, have worked to raise awareness about Devil's Elbow, an important wetland on the Stewart River.

In September 2005, a new interpretive path was opened at km 10.5 on the Silver Trail highway overlooking Devil's Elbow. The project was completed with the cooperation of Environment Yukon, Na-Cho Nyäk Dun First Nation, Mayo Renewable Resources Council, Silver Trail Association, Yukon Fish and Wildlife Management Board, Habitat Stewards, Ducks Unlimited Canada, Yukon's Heritage Branch, Yukon department of Highways and Public Works, as well as the support and contributions by many Elders, youth, and other community members.

The 750-metre trail encourages visitors to discover the age-old movements of the moose, the river, and the Na-Cho Nyäk Dun, the Big River People. The walk culminates at a viewing deck overlooking the Stewart River Valley and its important wetland habitat for moose and waterfowl.

A process examining the potential for Devil's Elbow Big Island to become a Habitat Protection Area is currently underway.

OLD CROW FLATS SPECIAL MANAGEMENT AREA

Old Crow Flats is the Yukon's largest wetland complex and is an internationally recognized site through the Ramsar Convention. Located on the Old Crow River system north of the Arctic Circle, the Flats contain more than 2,000 ponds and marshes ranging in size from one-half to 4,700 hectares. The area is an important breeding and moulting ground for 500,000 water birds, waterfowl, muskrats and other wildlife of the Flats, which are of great importance to Vuntut Gwitchin.

Under the terms of the Vuntut Gwitchin First Nation Final Agreement, the southern part of the Old Crow Flats Special Management Area (SMA) will be managed under the guidance of a management plan and a designation yet to be determined. The northern part was included in Vuntut National Park of Canada and a management plan specific to the park has been completed. The focus of the Old Crow Flats SMA will be to maintain the area as one ecological unit with the conservation of fish, wildlife and their habitats, and the continuation of traditional use by Vuntut Gwitchin as guiding principles. In 2005, the Yukon government and the Vuntut Gwitchin First Nation began discussions on the process for management planning and designation for the area.

Table 5.1. *Status of Important Yukon Wetlands*

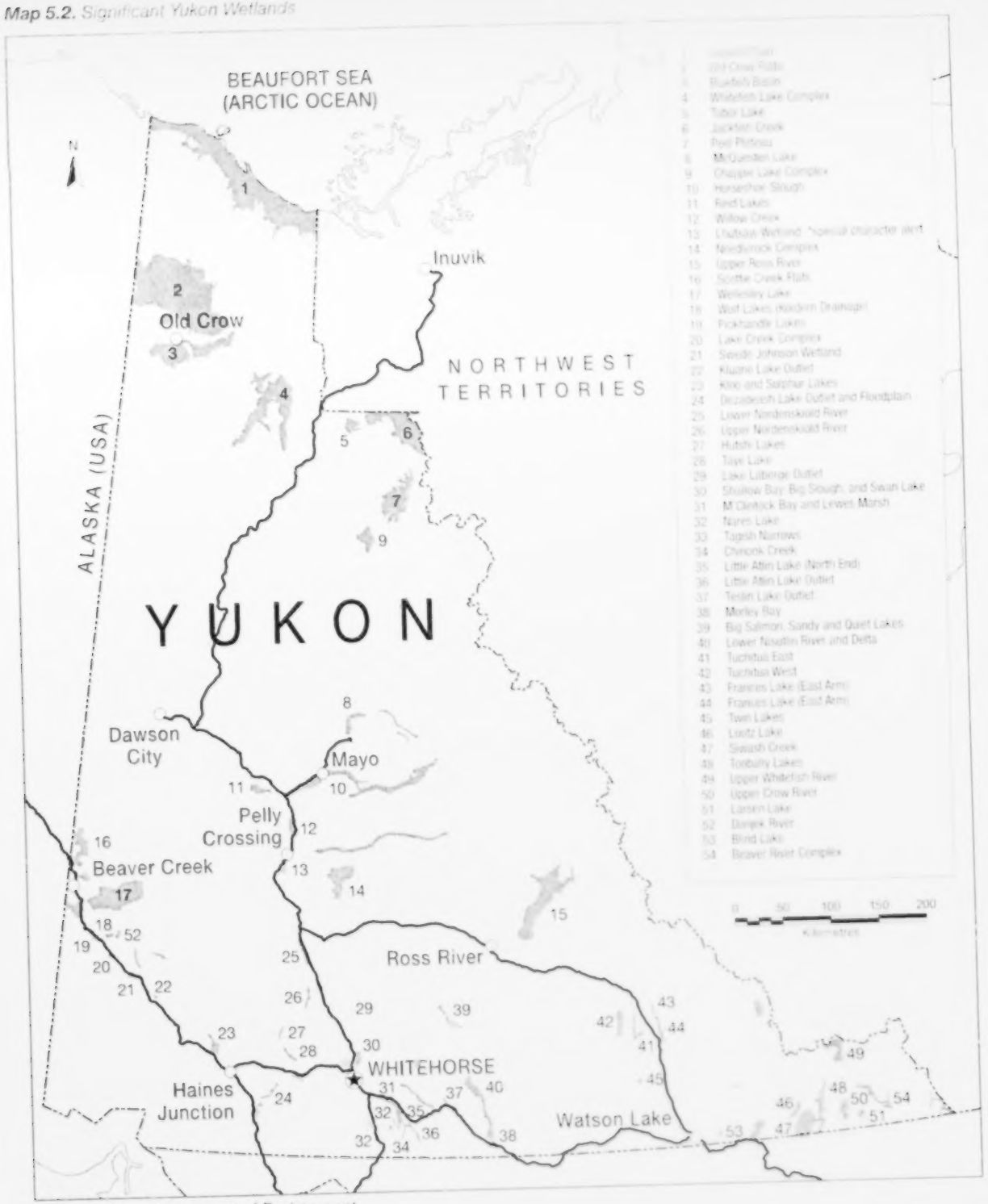
SITE #	NAME	STATUS
1	Northern Coastal Plain	National Park
2	Old Crow Flats	Special Management Area
3	Bluefish Basin	
4	Whitefish Lake Complex	Map Notation
5	Tabor Lake	
6	Jackfish Creek	
7	Peel Plateau	Map Notation
8	McQuesten Lake	Map Notation
9	Chappie Lake Complex	Map Notation
10	Horseshoe Slough	Habitat Protection Area
11	Reid Lakes	Map Notation
12	Willow Creek	Map Notation
13	Łhútsäw Wetland	Special Management Area
14	Needlerock Complex	Map Notation
15	Upper Ross River	Map Notation
16	Scottie Creek Flats	Map Notation
17	Wellesley Lake	Map Notation
18	Wolf Lakes (Koidern Drainage)	
19	Pickhandle Lakes	Map Notation
20	Lake Creek Complex	Map Notation
21	Swede Johnson Wetland	Map Notation
22	Kluane Lake Outlet	Map Notation
23	Kloo and Sulphur Lakes	Map Notation
24	Dezadeash Lake Outlet	Map Notation
25	Lower Nordenskiold River	Special Management Area
26	Upper Nordenskiold River	Map Notation
27	Hutshi Lakes	Map Notation
28	Taye Lake	Map Notation
29	Lake Laberge Outlet	Map Notation
30	Shallow Bay, Big Slough, and Swan Lake	Map Notation
31	M'Clintock Bay and Lewes Marsh	Map Notation
32	Nares Lake	Map Notation
33	Tagish Narrows	Map Notation
34	Chinook Creek	Map Notation
35	Little Atlin Lake (North End)	Map Notation
36	Little Atlin Lake Outlet	Map Notation
37	Teslin Lake Outlet	Map Notation
38	Morley Bay	
39	Big Salmon, Sandy, and Quiet Lakes	Map Notation
40	Lower Nisutlin River and Delta	National Wildlife Area
41	Tuchitua East	Map Notation
42	Tuchitua West	Map Notation
43	Frances Lake (East Arm)	Map Notation
44	Frances Lake Outlet and Frances River	Map Notation
45	Twin Lakes	
46	Lootz Lake	Map Notation
47	Siwash Creek	Map Notation
48	Toobally Lakes	Map Notation
49	Upper Whitefish River	Map Notation
50	Upper Crow River	Map Notation
51	Larsen Lake	Map Notation
52	Donjek River	
53	Blind Lake	
54	Beaver River complex	

Source: Yukon Department of Environment

Map 5.2. *Significant Yukon Wetlands*

Source: Yukon department of Environment

Map 5.2. Significant Yukon Wetlands



Source: Yukon department of Environment

Conclusion

The Yukon Territory has a rich and diverse natural environment. Compared to many other regions of the world, we are lucky. We have not yet compromised our environment in any significant way. With the knowledge we have about the current state of our environment we can move towards the future with a clear idea of where we are coming from. We have the benefit of being able to learn from the experience of others as we make decisions about how we develop here in the Yukon. Ensuring we are headed in a sustainable direction underlines all of our planning processes.

By compiling the State of the Environment Report, the Yukon government is fulfilling the requirements of the Yukon *Environment Act*. The hope is this report will help us all understand what is happening with our environment and to engage us in a discussion about where we are doing well and where we need improvement.

Glossary

Ambient Air Pollution.....The degradation of the quality of non-conditioned outside air resulting from unwanted chemicals or other materials occurring in the air.

Canada-Wide Standards.....National scientific standards that include the establishment of acceptable levels in ambient air for $PM_{2.5}$ and O_3.

Carbon Monoxide (CO).....An air pollutant that is a colourless, odourless, poisonous gas produced by incomplete combustion; particularly, incomplete burning of carbon-based fuels such as gasoline, oil and wood.

Coliform.....A group of bacteria that, if present in water, show that other pathogens may exist. Coliform bacteria are indicator organisms and may not be harmful themselves.

Contaminated Site.....“A site at which substances occur at concentrations: above background levels and pose, or are likely to pose, an immediate or long-term hazard to human health and the environment; or exceed levels specified in policies and regulations;” (INAC Contaminated Sites Management Policy) or “an area of land in which the soil, including any groundwater lying beneath it , or the water including the sediment and bed below it, contains a contaminant which is an amount, concentration or level in excess of that prescribed by regulation or allowed under a permit.” (Section 111, *Yukon Environment Act*)

COSEWIC.....(Committee on the Status of Endangered Wildlife in Canada) A committee of experts that assesses and designates which wild species are in some danger of disappearing from Canada.

Cryptosporidium.....*Cryptosporidium enteritis* is an infection of the small intestine characterized by diarrhea, which is caused by the parasite cryptosporidium.

Data Deficient.....A species for which there is insufficient scientific information to support status designation. (COSEWIC Designation)

Giardiasis.....A disease that results from an infection by the protozoan parasite *Giardia lamblia*, caused by drinking water that is not properly treated. The disorder is more prevalent in children than in adults and is characterized by abdominal discomfort, nausea, and alternating constipation and diarrhea.

Greenhouse Effect.....The effect produced as greenhouse gases allow incoming solar radiation to pass through the Earth's atmosphere, but prevent most of the outgoing infra-red radiation from the surface and lower atmosphere from escaping into outer space. This process occurs naturally and has kept the Earth's temperature warmer than it would otherwise be. Current life on Earth could not be sustained without the natural greenhouse effect.

National Accord For The Protection Of Species At Risk	An Agreement among federal, provincial and territorial governments to work on a common approach to protecting species at risk in Canada that includes complementary legislation and programs to protect habitat and species. Yukon signed on in 1998.
National Ambient Air Quality Objectives (NAAQOs)	National scientific objectives that set out benchmark levels of protection for people and the environment in Canada, including maximum desirable and acceptable levels of CO and NO_x.
Nitrogen Oxides (NO_x)	Nitrogen-based compounds released during the combustion of fossil fuels.
Ozone (O_3)	A molecule that consists of three oxygen atoms bonded together. Ozone that is present in the earth's troposphere is mostly a result of human-caused pollution.
Ozone Depletion	Chemical destruction of the stratospheric ozone layer beyond natural reactions. Stratospheric ozone is constantly being created and destroyed through natural cycles.
Particulate Matter (PM)	Airborne particulate matter, known as PM, is one of the major components of smog. PM include microscopic particles in the air. These particles, capable of being inhaled by humans, are divided into two size ranges $PM_{2.5}$ and $PM_{<10}$. A third category is ultrafines, a subgroup of $PM_{2.5}$, which are particles <0.1ug
Parts Per Million (PPM)	This term give scientists a way to describe how much of a substance is contained in a sample. e.g. parts of CO per million parts of air
Special Management Area	An area identified and established within a Traditional Territory pursuant to Chapter 10 of First Nation Final Agreements.
Special Waste	Any waste material that is potentially dangerous, including but not limited to material that is explosive, radioactive, ignitable, corrosive, toxic, or reactive.
Volatile Organic Compounds (Vocs)	Organic compounds that evaporate readily into the air. VOCs include substances such as benzene, toluene, methylene chloride, and methyl chloroform.

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Specific

Figure 4.3.1: Sources: Data provided by Engineering & Environmental Services, City of Whitehorse, and Education Department at Raven Recycling.

Figure 4.3.2: Source: Data provided by Engineering & Environmental Services, City of Whitehorse.

Figure 4.3.3: Source: Data provided by Engineering & Environmental Services, City of Whitehorse.

Figure 4.3.4: Source: Data provided by Engineering & Environmental Services, City of Whitehorse.

Figure 4.3.5: Source: Datae provided by Engineering & Environmental Services, City of Whitehorse

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